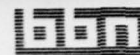


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Quarterly Progress Report No. 5,
2 January 1977 to 2 April 1977

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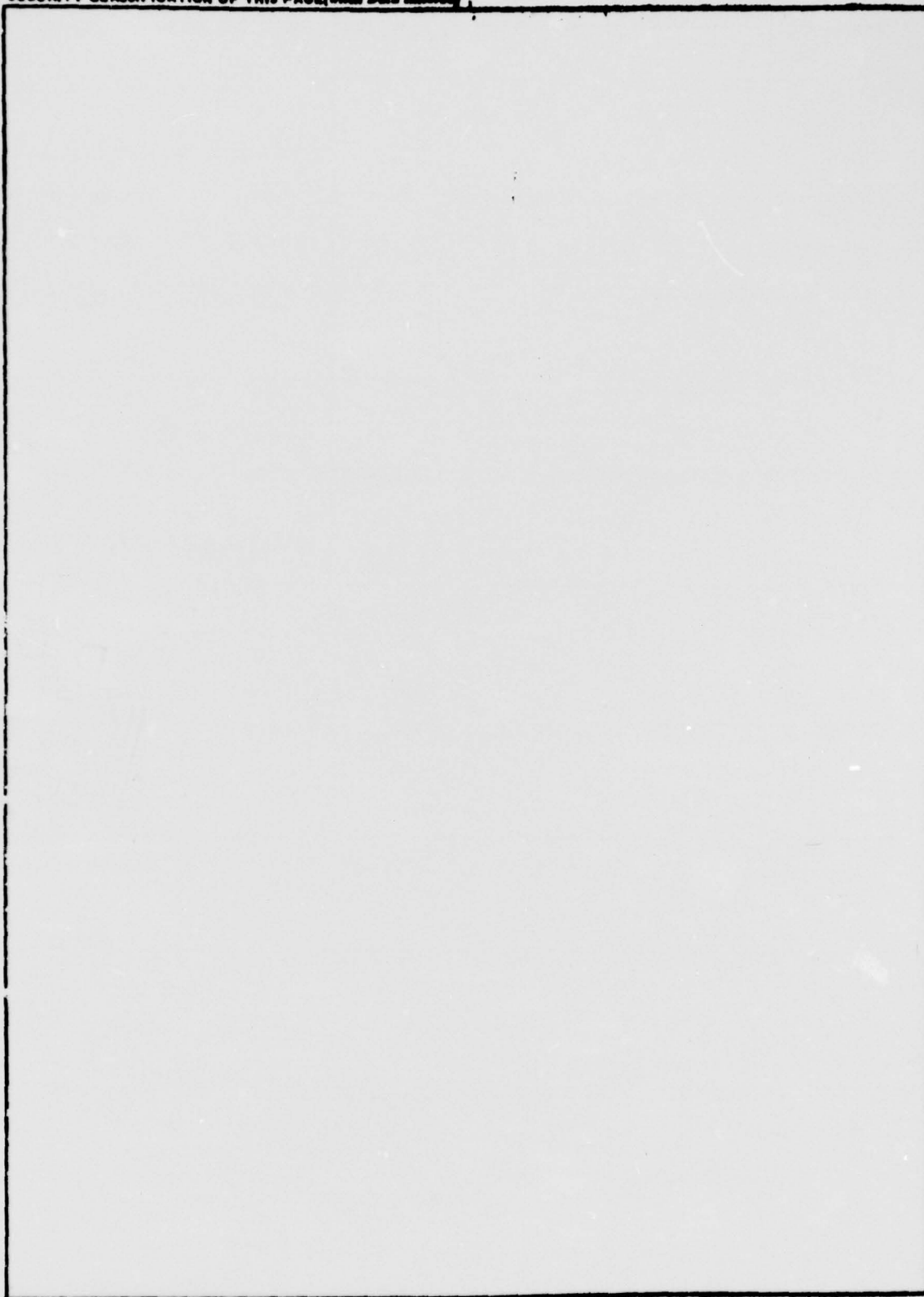
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MESSAGE TECHNOLOGY RESEARCH AND DEVELOPMENT

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1. INTRODUCTION

This report covers progress in message technology under the contract "Message Technology Research and Development" for the period 2 January 1977 through 2 March 1977.

This work is a continuation of work on MAILSYS/HERMES performed under the ARPA Contract "Distributed Computation and TENEX Related Activities" during 1975.

During the January through March quarter, the primary effort of the HERMES project was directed toward implementation of the version of HERMES under the DARPA/NAVY/CINCPAC test (the Military Message Experiment or MME).

HERMES 3.5

During this period, we extended the facilities of the generalized HERMES system in parallel with the developments required for the CINCPAC-HERMES system. At the beginning of the quarter, we developed and released parallel implementations of the HERMES system, Version 3.5, one with the simulated security features, and the compatible "civilian" version.

MME-HERMES

We implemented MME-HERMES, which is a simulated demonstration version of the proposed multilevel secure CINCPAC

version of the HERMES system. The object was to create a system with the same user interface as the projected secure HERMES system. Security is simulated by causing message-fields to carry security labels, and by providing commands within HERMES for all file-handling and other TENEX functions. MME-HERMES provides a total message management and text-processing environment in which users login and logout directly without accessing the TENEX Executive System.

To keep track of ACTION and COG assignments in MME-HERMES, we created a new facility called the ACTION-LOG which facilitates the task of the CINCPAC Action Officer, and other personnel involved in monitoring the flow of messages within CINCPAC. Formal release is accomplished through a special MME-HERMES command that checks for address and proper authorization.

We implemented a PDP-11 interface between the TENEX monitor and the terminals to be employed in the MME evaluation, which improved performance at the user level and facilitated the use of the WE Editor and the display of security information on the screen of the user's scope terminal.

We also implemented the interface between the HERMES system, running on the TENEX operating system, and the Navy's LDMX message system. Messages inbound from the AUTODIN network through the LDMX are processed through a receiver program that performs subject extraction and initial message distribution.

Messages outbound from the TENEX installation are processed through the release function alluded to above, and then physically transferred to the LDMX computer.

The distinctive features of MME-HERMES are documented in SR-1. "MME-HERMES: AN INTRODUCTION", in the Supplementary Reports Section of this progress report. The details of the proposed BBN Security Design for MME-HERMES are documented in SR-2. "BBN SECURITY DESIGN".

Other New Features

Our MME implementation of HERMES also included a number of new features which are applicable to both the regular and the multilevel secure version of Hermes. Most of these were designed during the previous quarter, and were implemented for the MME Evaluation.

The the new features include user-created fields, which allow the user to create new message-fields (in a choice of four datatypes), the COMMENT command, which allows the user to create a comment-field corresponding to any standard message-field or any user-field, and two facilities for circulating messages in the draft state, the REFILE and REDISTRIBUTE commands.

The WE Scope Editor

A final configuration of the WE Editor for the HP2640/45 Scope terminals was installed and implemented following extensive testing by BBN and MITRE personnel. The modular nature of the WE program has allowed alternative patterns of interaction between the terminal and the user to be evaluated, and future reconfigurations will be evaluated.

Structured Documentation

We implemented a structured documentation facility consisting of a set of topics with associated examples. The topics are organized in a structured outline, and the documentation commands allow the user to review the outline to varying levels of depth, in broad outline, or in narrow detail. Documentation can be output to the user's terminal, to a line-printer, or to files. The user can specify the output of small sections of text, or can cause HERMES to generate a multi-page document with a title page and table of contents.

Improved Handling of Message-Files

A new implementation of the auxiliary files used to aid the handling and searching of message-files was completed, and resulted in a substantial speed up of the time required to input a message-file and a great increase in the maximum number of

messages that can be entered in a single message file. The time for searching message-files was also considerably decreased.

Load Tests Simulating Navy Conditions

We performed a series of load tests with MME-HERMES, using simulated LDMX messages and simulating Navy operating conditions.

Data Management

The capabilities of the Hermes system have been extended to the point where Hermes can be used as a powerful data management tool for many varied types of records that might be created in an office environment. The Supplementary Reports section of this progress report contains an example of such an application, SR-3. "HERMES IN DATA MANAGEMENT: THE BLUE FILE".

Implementation of HERMES on the TOPS-20 Monitor

Following the installation at BBN of two new host computers with Digital Equipment Corporation's TOPS-20 Monitor, which is a close relative of the TENEX Exec, we began the task of converting the Hermes program to the TOPS-20 Monitor.

The first Hermes version to run on TOPS-20 was HERMES 3.5, which was installed February 1977. All subsequent versions have been fully convertible between TENEX and TOPS-20.

Statistics on Hermes Use

We have continued to collect and analyze statistics on HERMES usage.

Human Factors

We completed the questionnaire and interview items described in QPR No. 4 for review by NAVELEX, CINCPAC and MITRE.

Future Plans

Following the MME Evaluation, we directed our efforts to three parallel projects.

1. To implement and release Hermes 4.0 without security features for general use by DARCOM and other users through ARPANET on the BBN host computers, and on the OFFICE-1 and ISI hosts; also to continue the design and implementation of improvements in Hermes fetures and to work for increased efficiency and speed in Hermes operations.
2. To complete the LDMX-TENEX Communications Control Program which will be required in the MME to pass messages from the LDMX to TENEX, and back again.
3. To begin study of future message-system tasks and configurations. These involve:
 - a) Study of the adaptation of HERMES to minicomputers and terminals with built-in computing facilities.
 - b) Study of possible revision of the HERMES user interface.
 - c) Study of the long range design problems and possibilities, with respect to user interface, system architecture, automation of message functions, and integration of the message system with office automation facilities.

2. HERMES 3.5 WITH AND WITHOUT SECURITY FEATURES

Parallel version of Hermes 3.5, called HERMES and CINCPAC-HERMES, were installed on selected BBN and ISI host computers in January 1977. The two programs were identical except for simulated security features in reading and creating messages.

In addition, the non-secure version was released on all BBN systems except BBNE.

New features in both versions of Hermes included:

- a) Structured documentation.
- b) The COMMENT command.
- c) The top-level ADD command for updating sequences.
- d) The two "life-style" switches, SPACE-FUNCTION and CR-FUNCTION.
- e) The UPDATE-PROFILE switch for automatically saving filters, templates, and switch settings from session to session.
- f) The revised ? facility for showing long lists of possible choices in smaller subgroups.
- g) The User-Field facility.
- h) The WE-Editor for HP2640/45 scope terminals.

These features are documented in the previous progress report, QPR No. 4, or in the Supplementary Reports section of this progress report in SR-1. "MME-HERMES: AN INTRODUCTION."

3. MME-HERMES 4.0

The version of Hermes developed for the MME Evaluation, MME-HERMES, is a simulated demonstration version of the proposed multilevel secure CINCPAC version of the HERMES system. MME-HERMES was installed on BBNF in February 1977. The user documentation for MME-HERMES is reproduced in the Supplementary Reports Section of this progress report. This is not a complete Users' Guide, but is intended as an exposition of the features of MME-HERMES that were new at that time.

Some features of MME-HERMES were designed especially for the needs of the CINCPAC organization. These are the security design, the ACTION LOG, the Release feature, the LDMX-HERMES Translator, and the PDP-11 Interface between the the HP 2640/45 terminal and TENEX.

3.1 The Security Design

MME-HERMES is a simulated demonstration version of the proposed multilevel secure version of HERMES designed for CINCPAC. MME-HERMES appears to be a single HERMES program, very similar to the current HERMES. The chief difference is that the message-fields carry security-level labels.

It is possible to use all features of regular HERMES to read and create messages, and to create and modify such HERMES tools as sequences, filters, templates and switch settings. However, access to the functions of the TENEX Executive program is limited to the normal pre-login commands.

A user logged in at a given security level, is able to see all information at that security level or lower, but throughout the HERMES session, is unaware of the existence of any part of the MME-HERMES system at a security level above the login security level.

For example, a message in an MME-HERMES message-file may contain an UNCLASSIFIED (U) Subject: field and a TOP-SECRET (T) Text: field. To a user logged in at any level below TOP-SECRET, the message appears to have a subject: field but no Text: field, and there is no way of knowing whether or not a Text: field exists. However, a user logged in at TOP-SECRET, is able to see both the Subject: and the Text: fields. When messages are created the user is required to give special commands to set the security level of individual message-fields. All such fields must be at the login security level or lower. The details of the method of achieving security in MME-HERMES are contained in SR-2. "BBN SECURITY DESIGN FOR MME-HERMES" in the Supplementary Reports section of this progress report.

3.2 The ACTION LOG

The new HERMES facility called the ACTION-LOG keeps track of ACTION and COG assignments within CINCPAC. This can be thought of as a specialized message-file which contains an unclassified summary of the routing information for each message. Without leaving his own message-file, each user can query the ACTION-LOG and search for messages on the basis of the LDMX fields DTG (date-time-group) and FROM, or of the Action-Cog assignment, or of the Suspense-Date.

HERMES automatically updates the ACTION-LOG whenever the Action-Cog assignment or the Suspense-Date is changed through an ACTION, or COG command. Alternatively, a user may search the ACTION-LOG, and make a change to the entry for a message summarized there. This causes a citation message to be sent to the Action Officer and the other persons involved, notifying them of the change of assignment.

3.3 The RELEASE Feature

Formal RELEASE of a message to AUTODIN for transmission outside CINCPAC is accomplished by a new RELEASE command. This command places an appropriate address on the message, checks to see that the user is authorized to RELEASE messages and places the message in a queue in a designated RELEASE file for the LDMX to pick up.

3.4 The LDMX-HERMES Translator

An LDMX-HERMES translator transforms the incoming LDMX messages into messages that conform to HERMES standards and similarly translates outgoing HERMES messages to LDMX standards.

3.5 The PDP-11 Interface Between the HP 2640/45 and TENEX

The hardware configuration for the MME TENEX system included a PDP-11 to act as a front-end concentrator for the HP2640/45 scope terminal. We utilised this PDP-11 to provide two additional functions:

- a) To provide a very responsive cursor moving function to the WE scope editor, and
- b) To provide an interface to the terminal for displaying the current and maximum security levels of information displayed on the user's screen.

A protocol was established between the user's terminal, the PDP-11 and TENEX to allow for responsive cursor movements. The PDP-11 would keep track of where the cursor was, transmitting this information to the user's TENEX job (i.e. WE) whenever a non-cursor-moving character was typed on the terminal. All other characters were transmitted immediately to TENEX. This allowed immediate response for cursor movement commands and significantly reduced the TENEX load while the user was in the WE Editor.

Two kinds of security information were displayed on the user's screen. The top line of the screen displayed the maximum security level of all the information currently displayed on the screen. As data of a higher level scrolled off the top of the screen, the display for the maximum level was changed by the PDP-11 software to reflect the current maximum being displayed.

In addition, the security level for each line on the screen was displayed as the first character on the line in inverse-video. This permitted the user to tell quickly at what security level he was currently working, regardless of the maximum security level on the screen.

4. LOAD TEST TECHNIQUES

Procedures for testing the effect of any combination of hardware and user pattern on Hermes were developed.

Dedicated use of the machine on which the test is to be run is required. A "master" program starts up as many simulated users ("slaves") as desired, while one or more monitoring programs are used to collect data describing the load, paging rate, or any other system parameter. Each slave is driven by a script file which may or may not vary between slaves. This allows us to test the efficiency of the overall configuration, to determine where improvements must be implemented, to measure the effects of coding changes, and to tailor the system to a particular usage pattern.

A special command, WAIT, has been added to HERMES to allow the script files to introduce delays to simulate the time required for Hermes users to type in commands, for the HERMES system to print out messages on the users' terminals, and even for users to stop and think between HERMES commands.

At the present, the capability to simulate up to 23 slaves per master has been attained. Each slave may have as long a script as desired, and can be automatically restarted when the script is exhausted. Output produced by each slave can be retained, providing valuable data for performance analysis.

Reponse time can be measured as a function of background load by executing prepared scenarios by hand against background loads at different load points. Throughput can be measured by measuring units of work accomplished (e.g., messages sent) per unit time at different load points. The utilization of system resources can be measured by running an analysis program that measures such variables as memory, CPU, and swapping channel utilization while the test is being run. It is possible to detect the conditions under which the system becomes saturated, and to determine the particular aspects of the system that cause saturation to occur.

5. THE LDMX-TENEX INTERFACE

We implemented a Communications Control Program which handles IXS/RIXT communications protocol. This program passes messages from the LDMX into the TENEX System and from TENEX into the LDMX.

Much effort during this period was expended in fine tuning of the TENEX and corresponding LDMX interface code to achieve full conformity with the details of Navy protocol logic. Live testing was accomplished involving direct TENEX-LDMX communication through phone lines between BBN Cambridge and the Washington Navy Yard Testbed LDMX site.

We also completed development of an interim system which can record messages from the LDMX on magnetic tape and then load them into the TENEX system as input for the MME message processing system.

We were able to input messages from the Testbed LDMX into the TENEX System by using this interim system. The load tests described in Section 4 of this report made use of this interim magnetic tape system in the production of simulated LDMX messages.

The LDMX messages passed through the Communications Control program into the TENEX system are then used as input for the LDMX-HERMES translator described in section 3.4, which perform

subject extraction and initial distribution for the HERMES program. Messages output by HERMES through the RELEASE feature described in section 3.3 are translated into LDMX format LDMX-HERMES translator and then passed through the Communications Control program into the LDMX system.

6. THE USE OF HERMES IN DATA MANAGEMENT

As described in QPR No. 4, we have implemented user-created message-fields within the HERMES system. This feature extends the capabilities of HERMES to handle message structures other than the current ARPANET standard, and allows HERMES to create and handle information records other than messages. The data manipulation functions designed for message management can now be used to manage other, varied types of files that might be created in an office environment.

The user-field mechanism allows the HERMES user to establish and name new types of information-containing fields.

- a) All Hermes functions can be applied to newly defined information fields, just as though they had been built into the system from the beginning.
- b) Few users will need to concern themselves with the definition process. One individual can set up a new Hermes application for many other users.
- c) Records containing newly defined fields can be transmitted as messages (to other Hermes systems) or managed as conventional data files. As far as Hermes is concerned, messages and general records are one and the same.
- d) Hermes is quite flexible about record and file content: not all fields need be present in each record, and a file can contain records of mixed type -- for example a mixture of messages and general office records.

The SR-3. "HERMES IN DATA MANAGEMENT: THE BLUE FILE" contains an illustration of the use of this new tool to organize and manage a database of information on Navy and civilian ships.

BBN Report No. 3541

Bolt Beranek and Newman Inc.

SUPPLEMENTARY REPORTS

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SR-2. BBN SECURITY DESIGN FOR MME-HERMES

SR-3. HERMES IN DATA MANAGEMENT: THE BLUE FILE

SR-1

MME-HERMES

AN INTRODUCTION

February 18, 1977

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SR-1

MME-HERMES

AN INTRODUCTION

This paper is aimed primarily at those of you who have come to know basic HERMES, but are not yet familiar with MME-HERMES, the new generation HERMES system we have developed for CINCPAC. The paper focusses on the special needs of CINCPAC, the features of MME-HERMES that are intended to meet those needs, and provides general information on computer supported message processing in the CINCPAC environment.

For those unfamiliar with basic HERMES, this writeup plus the first few sections of the User Guide will provide a general introduction to the system with special emphasis on the CINCPAC perspective.

Message communication in the ARPAnet consists mainly of informal traffic among loosely coupled individuals. In contrast, CINCPAC must deal with formal as well as informal traffic, and message processing at CINCPAC is performed by a close-knit organization of collaborating individuals. CINCPAC also has special needs that arise from its interconnection with the Autodin network, and from the fact that military messages will frequently contain classified information.

The features of MME-HERMES that address these needs are outlined briefly below and expanded in the next sections. Additional, detailed information is also provided by the Scenario Responses that accompany this document.

1. Individuals and Roles MME-HERMES supports the distinction between individuals and the roles (e.g., J33, J301) an individual may assume. HERMES makes it possible for an individual to assume different roles from time to time, while still retaining information that tailors the system to his own preferred characteristics and privileges. It is also possible for more than one individual to assume a given role.
2. Message Flow MME-HERMES contains features that support formal and informal circulation of messages among the CINCPAC staff. For general informal circulation ("info" copies of Autodin Traffic, draft messages in preparations, etc.) MME-HERMES contains a new command called REDISTRIBUTE. Users may redistribute a message intact to other users within CINCPAC; the only change is the addition of three new fields that indicate the redistributees, the redistributor and the date.

The ACTION and COG commands perform the distribution function where transfer of ACTION or COG responsibility is involved. Notification of assignees and record keeping are performed automatically.

3. Annotation and Message Editing CINCPAC users will need to annotate and comment on messages as they are passed from individual to individual, and to edit draft messages. MME-HERMES supports a number of editing operations.

The EXPLODE command opens up a message for general editing; all editing functions can be applied and any message field can be changed in anyway. ANNOTATE opens a message for restricted editing. Comments and certain other new information can be added, but the integrity of the original message fields is preserved.

Both EXPLODE and ANNOTATE provide access to the command repertoire of the HERMES Message Editor. To meet the needs of CINCPAC we have extended the editor somewhat. COMMENT is a new editor command that allows the user to attach comments, ~~comment~~ marked as such, to the fields of a message. REFILE makes it possible to return a message to its original file position after editing. Edited or Annotated messages can also be disposed of through REDISTRIBUTE, ACTION-COG and SEND.

4. The Action Log To keep track of the ACTION and COG assignments, we have created a new HERMES facility called the ACTION-LOG. This can be thought of as a specialized message-file which contains an unclassified summary of the routing information for each message. Without leaving his own message-file, each user can query the ACTION-LOG and search for messages on the basis of the LDMX fields DTG (date-time-group) and FROM, or of the Action-Cog assignment, or of the Suspense-Date.

HERMES automatically updates the ACTION-LOG whenever the Action-Cog assignment or the Suspense-Date is changed through an ACTION, or COG command. Alternatively, a user may search the ACTION-LOG, and make a change to the entry for a message summarized there. This causes a citation message to be sent to the Action Officer and the other persons involved, notifying them of the change of assignment.

5. Security CINCPAC must deal with message traffic at different security levels. MME-hermes supports this need through a

number of security provisions. Security bookkeeping is provided by separating and labeling the message parts and other information that may exist at various security levels.

Basic DoD security policy is also supported. Classified information can be accessed at or below the current security level of the user; new information can only be created at that level. HERMES provides commands for moving from level to level, and for automatically changing level when eliciting information from the user in prompt-driven input sequences.

6. Interconnection with AUTODIN MME-HERMES provides a two way interface with the AUTODIN network. Messages inbound from Autodin are processed through a receiver program that performs subject extraction, and initial message distribution.

Formal RELEASE of a message to AUTODIN for transmission outside CINCPAC is accomplished by a new RELEASE command which checks for proper release authority and then queues the message for outbound transmission. This command places an appropriate address on the message, checks to see that the user is authorized to RELEASE messages and places the message in a queue in a designated RELEASE file for the LDMX to pick up.

7. The MME-HERMES Environment In creating MME-HERMES we added file handling and other mechanisms that make it unnecessary to have recourse to the Tenex Executive. MME-HERMES provides a total message management and text processing environment; users login and logout directly to and from MME-HERMES.

8. The WE Editor To take advantage of the display terminals to be provided at CINCPAC, we have designed and integrated into HERMES a text editor with full two-dimensional graphic capabilities.

NOTE: The intent of this paper is to document MME-HERMES as it will appear when all refinements are complete. Features which do not appear in 3.6x are marked "Not Yet Available."

I. INDIVIDUALS AND ROLES

HERMES supports the CINCPAC distinction between individuals and roles through the Tenex directory structure. Each individual user will have his own TENEX directory, e.g., JONES or ROBINSON. Another directory will be assigned to each role an individual user might assume, e.g., J3, J301, J333.

To act as himself a user will Login under his own name. This will individualize HERMES to the characteristics in his profile, plus give him access to his own personal data base of messages.

To act in a role, a user will first Login as himself, then Connect to the desired role. This will retain his personal profile characteristics but switch access to the message base of the role assumed. Example:

```
@LOGIN JONES <password><CR>
>CONNECT J301 <password><CR>
>
```

A user can also Login directly to a role, in which case he will acquire both the profile characteristics and message base of the role assumed.

Protection HERMES protects each role from unauthorized access through a password associated with the role. Ordinarily (as shown above) the user must type the password to assume the role.

Alternatively, the SCO (System Control Officer) can give selected users group access to a role, in which case the password is not needed (though typing it will do no harm).

Accountability Whenever accountability procedures call for the name of a user taking an action to be inserted in a HERMES field, both the Login (user) and the Connected (role) names will be shown. Example:

Redistributed-by: J301 JONES

II. MESSAGE FLOW WITHIN CINCPAC

Message flow in CINCPAC includes:

- o Formal transfer of Action-Cog responsibility.
- o Informal distribution and redistribution of messages for information purposes.
- o Circulation of draft messages prior to release.
- o Creation and circulation of informal messages within the command center.

Hermes provides basic support for these functions through the general message creation, sending, reading and filing operations. The following functions provide support for formal and informal message circulation.

A. DISTRIBUTING MESSAGES AND ASSIGNING ACTION

1. Redistribute*

Any user may, at any time, send an "info" copy of a message to any other user (without touching the Action-Cog assignment) through the command

```
>REDISTRIBUTE <message-sequence><CR>
Redistribute-To: <addressee-list><CR>
Refile?: <Yes/No?><CR>
OK to Redistribute?: <Yes/No><CR>
```

Example: JONES, acting as J31, sends copies of messages 6,21, 22 and to J313 and J314, and refiles the originals.

```
>REDISTRIBUTE 6,21:23<CR>
Redistribute-To: J313, J314<CR>
Refile?: Yes<CR>
OK to Redistribute?: Yes<CR>
```

* Note, that unlike the Hermes FORWARD command, REDISTRIBUTE does not wrap the message affected in a new "envelope". All fields of the original message remain accessible for searching, filing, etc.

Three new fields are added to each of the original messages,

Redistributed-To: J313, J314
Redistributed-By: J31 JONES
Redistributed-Date: February 14, 1977

Subsequent Redistribute operations will add new sets of Redistribution fields, thus providing a "distribution history" for each message.

Redistribute will support informal circulation of messages received from Autodin, messages created within CINCPAC, and draft messages awaiting release.

2. The ACTION and COG Commands

The ACTION or COG command prompts for the division or branch to which action is to be assigned, a list of Action-Cog addressees, and a Suspense-Date,

```
>ACTION <message-no.><CR>
Action-Cog[U]: <div-branch><CR>
Suspense-Date[U]: <date><CR>
Action-Cog-Info[U]: <addressee-list><CR>
OK to Redistribute?: <Yes/No><CR>
```

Example: User JONES, connected to the role-directory J301, examines the message-file <J3>ACTION-PENDING and assigns ACTION on Message 17 to J311, with Info copies to J3, which is the director's readboard, and to J313.

```
>GET <J3>ACTION-PENDING<CR>
>ACTION 17<CR>
Action-Cog[U]: J311<CR>
Suspense-Date[U]: 3 Mar 1977<CR>
Action-Cog-Info[U]: J3, J313<CR>
OK to Redistribute?: Yes<CR>
```

New fields are added, and the message is automatically refiled and circulated to the addressees in the Action-Cog and Action-Cog-Info fields. The ACTION-LOG is updated to show assignment to J311. The added fields are:

Action-Cog: J311 ACTION
Assigned-by: J301 JONES
Suspense-Date: 3 Mar 1977
Action-Cog-Info: J3, J313

The COG command marks the message with the word "COG" instead of "ACTION", and does not prompt for Suspense-Date.

3. The Suspense-Date Command

To change the suspense Date of an Action or Cog message without affecting its Action-Cog assignment:

```
>SUSPENSE-DATE <message-no.><CR>  
Suspense-Date[U]: <date><CR>  
Action-Cog-Info[U]: <addressee-list><CR>  
OK to Redistribute?: Y<CR>
```

New Suspense-Date and Action-Cog-Info fields are added to the message. The message is automatically refiled, and copies are circulated to the Action-Cog-Info addressee-list. The Action-Log is updated to reflect the changed date.

When a user wants information about the status of any message assigned action in CINCPAC, he queries the ACTION-LOG. Also, Action-Cog assignments and suspense dates can be changed through mechanisms built into the ACTION-LOG. To access the ACTION-LOG type:

```
>EDIT ACTION-LOG<CR>
```

This causes the Hermes system to enter the ACTION-LOG EDITOR. Once in the editor, four subcommands are available. When finished with the Action-Log, type "DONE" to get back to Hermes.

B. THE ACTION LOG

The ACTION LOG is a Hermes facility design to keep track of the CINCPAC ACTION and COG assignments. It can be thought of as a specialized message-file which contains an unclassified summary of the routing information for each message. Without leaving his own message-file, each user can query the ACTION-LOG and search for messages on the basis of the LDMX fields DTG (date-time-group) and FROM, or of the Action-Cog assignment, or of the Suspense-Date.

HERMES automatically updates the ACTION-LOG whenever the Action-Cog assignment or the Suspense-Date is changed through an ACTION, or COG command. Alternatively, a user may search the ACTION-LOG, and make a change to the entry for a message summarized there. This causes a citation message to be sent to the Action Officer and the other persons involved, notifying them of the change of assignment.

1. The JOURNAL Subcommand

JOURNAL allows the user to list specified messages from the ACTION-LOG. The form of the command is:

>>JOURNAL <sequence> <destination><CR>

where <sequence> may be specified as follows:

a) <Action-Log Entry>

This is a simple number which is the entry number of the message in the ACTION-LOG. Example:

```
>>JOURNAL 2872<CR>
(2872) DTG: 22095 12 Nov 1976 PSN: 6002
      From: AM EMBASSY MANILA
      ACTION assigned to J313
      Suspense date: 1 Jan 1977 Assigned by: J301 JONES
      Subject: SPECIAL FORCES CONFERENCE
```

b) DTG <date> <from-name>

This is a single message identified by the DTG and FROM fields. You must type in "DTG". Example:

```
>>JOURNAL DTG: 1 Nov 76 235552 SECDEF WASH DC<CR>
```

c) DIV-BRANCH <name>

This is a set of messages with a specified division or branch in the Action-Cog field. You must type "DIV". Example:

```
>>JOURNAL DIV-BRANCH: J311<CR>
```

d) SUSPENSE-DATE: <date>

This is a set of messages with a specified Suspense-Date. Example:

```
>>JOURNAL SUSPENSE-DATE: 19 Apr 77<CR>
```

e) ALL

This is the set of all messages in the ACTION-LOG. Example:

```
>>JOURNAL ALL<CR>
```

2. The SUSPENSE-DATE Subcommand

```
>>Suspense-Date: <message-no.>CR>  
    <journal printout>  
NEW Suspense-Date: <date>CR>  
Reconfirm suspense date: <date printout>  
OK? <Yes/No>CR>
```

Example:

```
>>Suspense-Date 2872CR>  
(2872) DTG: 22095 12 Nov 1976 PSN: 6002  
      From: AM EMBASSY MANILA  
      ACTION assigned to J313  
      Suspense date: 1 Jan 1977 Assigned by: J301 JONES  
      Subject: SPECIAL FORCES CONFERENCE  
NEW Suspense-Date: 15 Mar 1977CR>  
Reconfirm suspense date: 15 Mar 1977  
OK? YesCR>
```

3. The ACTION and COG Subcommands

The ACTION and COG commands are identical in form:

```
>>ACTION <message-no.>CR>  
    <journal printout>  
    Action-Cog: <name>CR>  
    NEW Suspense-Date: <date>CR>  
Reconfirm assignment: <Action-Cog printout> and  
    suspense date: <date printout>  
OK? <Yes/No>CR>
```

To mark the action on a message as completed, use the following form:

```
>>ACTION <message no.>CR>  
    <journal printout>  
    Action-Cog: COMPLETEDCR>
```

4. How the ACTION-LOG Notifies Users of Changes

The ACTION, COG and SUSPENSE-DATE subcommands cause the same entries in the ACTION-LOG as the top-level commands ACTION, COG and SUSPENSE-DATE. The ACTION-LOG then sends a brief message to everyone involved in the change and to the Action Officer. It is the Action Officer's responsibility to search his file for the original message and reprocess it with the appropriate commands.

III. ANNOTATION AND MESSAGE EDITING

A vital adjunct to message circulation is the ability to annotate or change the messages one has received. This can involve anything from commenting an Action message to wholesale editing or a draft for release.

The mechanisms that support these operations must reflect a concern for accountability, which will vary according to the circumstances. For example, the recipient of an Action message must be guaranteed that no one has changed the key parts of that message as received from AUTODIN. In contrast, when the task in hand is collaborative preparation of an outbound draft, those very same message parts must be opened up for modification and editing.

HERMES provides two basic commands for changing messages, that reflect these two concerns. Each employs the HERMES message editor as its underlying tool, and each serves to initiate an editing session. However, the capabilities granted to the user during that session will vary with the need for accountability.

EXPLODE opens up a message for total modification. the philosophy is "you break it - you own it"; any change is allowed, but the message is clearly marked to show that arbitrary changes may have been made, and to identify the responsible user.

ANNOTATE allows notes and comments to be added to a message, but protects the original content from change. Added information is marked as such, and subsequent recipients are assured that original information has not been modified.

1. Explode

To access a message for general editing type:

```
>EXPLODE <message no.><CR>
```

The message is brought up out of the current file into the message editor; the message editor is opened (HERMES types the double prompt >>). All commands in the message editor can now be brought to bear on the exploded message (See Part I, Chapter IV, HERMES USERS' GUIDE). In particular, new fields can be added, and existing fields can be erased or arbitrarily changed.

To indicate that a message has been exploded, HERMES rewrites its Sender:, Message-ID:, and Date: fields to reflect the current date, logged-in name and host computer.

2. Annotate (Not yet available)

To open up a message for restricted changes:

```
>ANNOTATE <message no.><CR>
```

The message is brought up into the message editor. Comments can be added to the message (see below) and new keywords can be added, but no other field can be changed, erased, or added to.

Comments and new keywords are marked by HERMES to identify user and date.

3. Comment

Within the limits sketched out above, a message opened up by EXPLODE or ANNOTATE can be freely manipulated by the commands of the message editor. The Comment command, in particular, is expected to be useful in CINCPAC, where users will want to add notes of various sorts to previously created messages. To attach a comment to a message field:

```
>>COMMENT <field name><CR>
```

Example:

```
>>COMMENT FROM: <CR>
(Type comment to CTRL-Z)
[FROM]: Note by STEVENS on 5 Jan 1977 1307 EST.
This address will change to BBNA after
Feb. 1.<CTRL-Z>
```

COMMENT causes a new field to be added to the message (in this case [FROM:]), named after the field commented on, with square brackets added to show it's a comment. HERMES automatically inserts user, date and time in the first line of the comment.

Successive comments can be attached to a given field, and a comment can itself be commented on (try it!).

4. Refile

With editing complete, how does one dispose of the changed or augmented message? One possibility is to put it

right back in the file where it came from. This can be accomplished by typing:

```
>>REFILE<CR>  
Retiling over message  
<survey of message>  
OK? <Yes/No><CR>
```

It's also possible to return a message to some particular slot in the file (possibly other than where it came from) by typing:

```
>>REFILE <message-no.><CR>
```

The message currently occupying that slot will be replaced. To put a message at the end of the file, type:

```
>>REFILE END<CR>
```

5. Circulating an Edited Message

An edited message can be circulated directly to other users without leaving the message editor.

Messages opened by EXPLODE can be circulated through Send or Redistribute. The SEND command works as described in the HERMES USERS' GUIDE -- the message is circulated to all addressees in the To, CC, BCC and FCC fields. Redistribute works as described previously.

Messages opened by ANNOTATE can be circulated through REDISTRIBUTE or ACTION-COG subcommands.

IV. SECURITY

The Hermes system supports CINCPAC security policy by classifying information according to four levels: Unclassified, Confidential, Secret and Top-Secret. Special commands allow the user to easily change from level to level and view and create information at different levels.

A. CHANGING SECURITY LEVELS

To change security levels, you type one of the commands:

```
>UNCLASSIFIED<CR>
>CONFIDENTIAL<CR>
>SECRET<CR>
>TOPSECRET<CR>
```

Hermes moves you to your requested level, or to your maximum allowable level if that is lower, and displays:

From: old-level To: new-level

B. MESSAGE-FIELDS

Within a message, message fields can exist at different security levels. A user cannot see fields of a higher level than his working security level. The security level of a field is indicated by a single letter following the field name. For example:

```
SUBJECT[U]:
KEYWORDS[C]:
```

Some fields are required to be unclassified, others can exist at any single security level, while others can exist at multiple security levels, as shown on the next page. For example, it is possible to have both TOP-SECRET and UNCLASSIFIED Subject fields in a message but the To field must always be unclassified.

To reclassify a message-field to your present security level:

```
>>RECLASSIFY <message-field><CR>
```

If you are reclassifying to a lower level, Hermes shows you the field and requires you to confirm every 20 lines.

| Unclassified | Single level | Multiple levels |
|--------------|---------------|------------------|
| Date | Text | Subject |
| Sender | In-Reply-To | Reference |
| Message-ID | Precedence | Keywords |
| From | Message-Class | Special-Handling |
| To | Start-Date | |
| CC | End-Date | |
| BCC | Suspense-Date | |
| FCC | | |

When composing a message, if you enter material for a single-level field at more than one working security level, Hermes allows you to merge the material into a single level. Before leaving the editor, Hermes will prompt you with a short series of questions and merge the material in the manner you specify.

C. COMPOSING MESSAGES -- SPECIAL TEMPLATE ITEMS

Because message composition will often require changes in the user's working security level, Hermes has a special set of template items which facilitate these changes. The items are:

Unclassified
Confidential
Secret
Top-Secret
Present-Security-Level
Ask-Level

During message composition when one of these items is encountered in a template, the Hermes system automatically switches to the specified level. (Again, if a level greater than the user's maximum level is requested, the system switches to the maximum level.) Composition continues at the specified level until another change is requested.

The "Present-Security-Level" item causes the Hermes system to return to the level at which the composition started, regardless of present level.

The "Ask-Level" item causes the system to request a level from the user.

For example a template to compose messages with secret subjects but arbitrary text fields would look like:

- (1) Unclassified
- (2) To:+
- (3) Secret
- (4) Subject:+

- (5) Ask-Level
- (6) Text:+

D. TERMINAL LOCKING

To prevent unauthorized use of a terminal, the Hermes system provides a locking feature. To lock your terminal, type:

><CTRL-Y>

The system then prompts you for a keyword and your password (neither the keyword nor the password is displayed):

Key to unlock console is: <keyword><CR>

Password: <user's password><CR>

To abort entering the keyword, type Rubout or CTRL-Q before the carriage return.

Once locked, no information will cross security levels within the Hermes system and no input will be accepted from the user until the terminal is unlocked by someone typing in the keyword. Any word can be used for a key any time a terminal is locked, however, if the key is forgotten only the system security officer can unlock the terminal.

V. INTERCONNECTION WITH AUTODIN

1. Inbound Messages

Messages arriving at CINCPAC via AUTODIN are entered into the Tenex system and preprocessed by a special interface program that translates from standard AUTODIN format into a more structured form suitable for manipulation by HERMES. The interface program directs its output into two message files.

Incoming Action or Cog messages are placed in the file <J301>MESSAGE, and all incoming messages are placed in the file <J3>INFO-READBOARD.

2. Release

Messages are released from HERMES to AUTODIN through a two stage procedure. The user desiring to release a message first routes it (by REDISTRIBUTE) to an individual or role with Release Authority. Physical release is then accomplished by the command:

```
>RELEASE <message-no><CR>
```

which places the message in a special outbound release queue. Messages queued for release are subject to an optional final screening and then processed through the outbound AUTODIN interface module.

Control over the release command and all subsequent stages is assured through reliable, long established protection features built into the TENEX monitor.

VI. THE MME-HERMES ENVIRONMENT

MME-HERMES has been expanded to include a number of basic support functions normally relegated to the TENEX Executive. This means that the message service can provide a total environment for the user. CINCPAC users entering the system are transferred directly into MME-HERMES and there is no need to learn or use the command repertoire of the TENEX Executive. In detail:

1. The TENEX LOGIN Command

@LOGIN <user><password><account><CR>

transfers the user directly into MME-HERMES. User names, passwords and accounts are assigned by the SCO. For each user there is a default account; typing <SPACE><CR> where account is called for will cause automatic selection of that account.

2. The QUIT Command

>QUIT <CR>

terminates a session with MME-HERMES and releases the system.

3. The CONNECT Command

As described in section I, the notion of individuals and roles is supported by the file directory -- one for each user-name under which it is possible to LOGIN. Logging in under a given name will establish the profile characteristics assigned to that user, and provide primary access to the files in his directory. To retain logged-in profile characteristics, but switch primary access to the directory of another user:

>Connect <user><password><CR>

4. Message-Files and Draft-Files

Message* and draft files are treated as HERMES objects.
Files have a simple name structure:

<user>file-name

Example:

<SMITH>MESSAGES

The directory name need only be supplied when accessing files outside the directory to which one has logged-in. Having logged in as himself, SMITH need only type the name:

MESSAGES

to refer to the above file.

MME-HERMES treats file names just like the names of other objects. They are recognized, extended and spelling-corrected as are other words and phrases in the HERMES vocabulary. The ? feature applies to files, meaning that

GET ?

will yield a list of all possible message files, while

GET A?

would list just those message-files beginning with "A". In a similar way, "?" will produce lists of draft-files in conjunction with APPEND-FILE or <CTRL-B> in the message editor.

As at present, files are initially created when information is first transferred into them. Message-files may be created with the FILE or MOVE commands. Draft-files may be created with the SAVE-FIELD command. (there is no STORE-DRAFT or RESTORE-DRAFT command in MME-HERMES.)

*The index file that accompanies each message file is hidden from the user in MME-HERMES. Operations on a message-file automatically extend to its index file. If a message-file is deleted, archived, or retrieved from archive, its companion index file travels along with it.

- a) All your message-files are listed in the special HERMES "object" named MESSAGE-FILES. To see all the message-files in your directory, type

```
>SHOW MESSAGE-FILES<CR>
```

for example,

```
>SHOW MESSAGE-FILES<CR>
JONESMSG
MESSAGE
PERSONAL
```

To get rid of a message-file, you must use the command

```
>EDIT MESSAGE-FILES<CR>
```

This opens up a specialized command group known as the message-file editor which allows you to delete message-files.

```
>>DELETE <file name><CR>
```

DELETE marks the entire message-file for deletion.

```
>>DELETE JONESMSG<CR>
>>SHOW<CR>
    MESSAGE
    PERSONAL
>>DONE<CR>
>
```

A deleted message-file, like a deleted message, may be undeleted:

```
>EDIT MESSAGE-FILES<CR>
>>UNDELETE JONESMSG<CR>
>>SHOW<CR>
    JONESMSG
    MESSAGE
    PERSONAL
```

Other subcommands are ABORT and the documentation subcommands.

Deleted message-files in the connected directory are automatically expunged (i.e., physically removed) when you leave HERMES with the QUIT or EXIT command. This

destroys the name of the file and any message it contains.

- b) All your draft-files are listed in a special HERMES "object" named DRAFT-FILES. To see all the draft-files in your directory, type

>SHOW DRAFT-FILES<CR>

To get rid of draft-files, you must user the command

>EDIT DRAFT-FILES<CR>

This opens up the draft-files editor, which has the same specialized set of commands as the Message-Files Editor.

Files will be archived and retrieved from archive by the following commands: (not yet available)

>ARCHIVE <file><CR>

and

>RETRIEVE <file><CR>

VII. THE WE EDITOR

WE is an editor designed for use on HP 2640/45 terminals. WE can be used to edit any field. It is invoked from the message editor by typing:

```
>>WE <field-name> <CR>
```

WE can also be invoked when entering a message field by typing <CTRL-K>. When an editing session is complete, return to Hermes by hitting the function key:

QUIT

Hermes prints out "Replace the Text field?" (or whatever field has been edited.) If you respond with Yes, Hermes inserts the edited version of the buffer as the new message field; if you type No, the edited contents of the buffer disappears and Hermes does not change the contents of the field. In either case, you are returned to the message-editor.

A. BASICS

1. The Display

The display presented by WE has two lines at the top which show information about the state of the editor and the text being edited. The remainder of the display is a view of part of that text. The cursor is used for indicating positions in the text. A guiding philosophy in the development of WE has been: You should be able to edit only what you can see on your display. That is: What you see is what you get.

Some consequences of this philosophy are:

- * Tabs cannot be distinguished visually from spaces. Therefore, we automatically enter the proper number of spaces whenever you type a tab.
- * Control characters are not visible. Therefore, when needed in the text, they are entered as up-arrow followed by the character.
- * The screen has a fixed width. Therefore the lines in the text may have at a maximum that length. Longer lines are automatically broken into multiple lines.

2. The Keyboard

Commands are given to WE by hitting various function keys. Text is entered by typing on the keyboard.

The particular arrangement of the WE function keys is selected by your installation and can be individually modified. All of the keys described below will be available.

B. EDITING FUNCTIONS

1. Cursor Movement -- UP, DOWN, LEFT, RIGHT and JUMP

The cursor determines where WE functions like deleting and overwriting affect the text.

To move the cursor from line to line without changing its horizontal position use UP or DOWN.

To move the cursor within a line use LEFT or RIGHT.

Pressing a cursor movement key moves the cursor one line or one character. Holding the key down causes the movement to be repeated until the key is released. To move the cursor over a specific number of characters, type the number followed by the command.

To move to a specific line in the text, type the line number and then hit the JUMP key.

2. Erasing Text -- ERASE/MOVE

The ERASE/MOVE key changes the mode of WE back and forth between erase mode and move mode. In move mode, LEFT, RIGHT, UP and DOWN simply move the cursor. In erase mode, the same motions erase the characters over which the cursor moves.

3. Modes of Movement -- WORD/CHAR, LINE

The unit of movement when using LEFT or RIGHT can be a character, a word or a line. To change back and forth between word mode and character mode, use the WORD/CHAR key. If you want to move to either end of the line you are working on, hit LINE, then LEFT or RIGHT.

4. Adding Text -- INSERT/OVERWRITE

whenever you type text on the keyboard, it is added to the text you are editing at the cursor location. When WE is in insert mode, the text is simply inserted. When in overwrite mode, the inserted text overwrites characters for character the text being edited. To switch between insert mode and overwrite mode, use INSERT/OVERWRITE.

5. Searching For Text -- SEARCH

SEARCH is used to locate words in the text being edited, and to place the cursor near them. When the key is hit the upper line of the display shows the word being sought. While typing in this word, the following control characters have special effects:

| | |
|--------------------|--|
| ^A, ^H, DEL | ERASE CHARACTER LEFT |
| ^W | ERASE WORD LEFT |
| ^Q | abort gathering search word |
| ^R | redisplay |
| ^E | toggles search mode between exact and case-independent searching |
| ^S, ^L, ^F, ^B, ^N | set mode of cursor placement |

The typing of the word to search for is terminated with any of the following characters: RETURN, LINEFEED, SPACE, TAB, CTRL-Z.

Search for the word is carried out in one of two modes:

Case-insensitive: "a" is regarded as the same as "A".

Exact: "a" and "A" are considered to be different.

E is used to specify the mode while typing in the search word.

On finding the searched for word in the text, the search stops and the cursor is placed near the word. This placement happens in one of five ways, as controlled by the following mode-specifying control characters which can be used while typing in the search string:

| | |
|----|---|
| ^S | on first character of search string (Start) |
| ^L | on last character of search string (Last) |
| ^F | on character to the right of search string (Following) |
| ^B | on the first character of the word containing search string (Beginning) |
| ^N | on the first character of the word after search string (Next) |

6. Formatting Text -- FORMAT

The FORMAT key is provided for "neatening" the edited text: lines are filled (and optionally justified). Blank lines are interpreted as paragraph breaks and any indentation at the beginning of a paragraph is preserved.

Formatting can be turned on and off within the text. A line containing only "^I" (two characters, up-arrow and "I")* signals the start of text which is not to be formatted. A line containing only "^I^I" signals the return to formatting. Formatting does not affect cursor position.

C. SPECIAL FEATURES

1. Tailoring WE -- PROFILE

PROFILE is used to modify a collection of mode control switches which determine finer details of the way in which WE carries out its various actions. Hitting this key produces a display which explains the profile switches, their options, and how to change them. This is self-explanatory.

2. Keyboard mode

WE permits the keyboard to be used to invoke the functions associated with the function keys. When <CTRL-Z> is typed, the functions associated with the function keys become available on the keyboard. Thus, the LEFT function is invoked by typing L, RIGHT by R, and so on.

Typing another <CTRL-Z> changes the meaning of the keyboard from command to its "normal" meaning of characters to be added to the text. Hitting <CTRL-Z> when in this text mode switches the keyboard back to command mode.

As a special aid, the INSERT and OVERWRITE commands automatically switch from CMD to KEYS mode, on the assumption that when you hit one of these you are intending to add characters to the text.

The keys corresponding to the function keys are:

-
- * "^I" is used by WE to represent all TAB (or CTRL-I) characters present in the contents of the field passed to WE from HERMES. The TAB key in WE inserts spaces. On return to HERMES, "^I"s are changed back to TABs. Thus formatting in WE and HERMES are compatible.

0-9 multiplying numbers
W C set WORD and CHAR mode (like toggling W/C)
U D UP and DOWN
L R LEFT and RIGHT
E M set ERASE and MOVE mode (like toggling E/M)
I O set INSERT and OVERWRITE mode (like toggling I/O)
% JUMP
Q DONE
H ABORT
F PROFILE

3. Editing-Characters

There are a set of control characters which have been implemented in WE to aid in correcting common typing errors:

| Control characters | Meaning |
|---------------------------|--------------------|
| <CTRL-H>, <CTRL-A>, | ERASE CHAR LEFT |
| <CTRL-W> | ERASE WORD LEFT |
| <CTRL-Q>, <CTRL-U> | ERASE LINE LEFT |
| <CTRL-R> | repaint the screen |

APPENDIX A - LOAD SCENARIO 1

Logon

>LOG USER-NAME <password><CR>

Role = J3x

>CONNECT J3x <password> <CR>

RETRIEVE VARIOUS MESSAGES OFF INFO READBOARD

>GET <J3>INFO-READBOARD<CR>

Examine headers of messages from SENDER between DTG1 and DTG2
Print out two of these

1. >SURVEY AFTER DATE1/BEFORE DATE2/FROM: SENDER<CR>
>PRINT 15,17<CR>

Examine headers of all messages with subject X between DTG3 and DTG4
Print out three of these

2. >SURVEY AFTER DATE1/BEFORE DATE2/SUBJECT X<CR>
10,25,28<CR>

Examine headers of all messages between DTG5 and DTG6 with keywords
A and B but not C
Print all of these out

3. >CONSIDER AFTER DATE5/BEFORE DATE6/KEYWORDS A/KEYWORDS B<CR>
>EDIT CSEQUENCE<CR>
>>ERASE KEYWORDS <CR>
>>DONE<CR>
>SURVEY CSEQUENCE<CR> or SURVEY<CR>
>PRINT CSEQUENCE<CR>

Examine headers of messages in Folder 1 with keyword K
Print out two of these

>SURVEY FOLDER1/KEYWORDS K<CR>
>PRINT 11,13<CR>

Examine headers of messages in Folder 2 with subject Y
Print these out

5. SURVEY FOLDER2/SUBJECT Y<CR>
>PRINT PREVIOUS<CR> or >PRINT <CTRL-P><CR>

Examine headers of messages in Folder 2 with Sender SENDER
Print these out
Annotate one of these and forward a copy to J311

```
6. >SURVEY FOLDER2/SENDER: SENDER<CR>
>PRINT PREVIOUS<CR> or >PRINT <CTRL-P><CR>
>ANNOTATE 31<CR>
>>COMMENT<CR>
[TEXT] NOTE BY J3X ON 23 DEC 76 0927-EST.
<Text of comment on message>
<CTRL-Z>
>>REDISTRIBUTE<CR>
Redistribute-To: J311<CR>
>>DONE<CR>
```

Examine the action log for J3
Add suspense dates to 3 actions
reassign an action from J312 to J313
Send a note to J312 and J313 explaining the change

```
7. >Edit ACTION-LOG<CR>
>>JOURNAL ALL<CR>
(Print-out of the journal entries for all messages
in Division J3.)
>>SUSPENSE-DATE (message) 2<CR>
(2) DTG: 080515Z Oct 1976 PSN: 1
Originator: 314 AIR DIV OC OSAN AB KOREA
Assignment: Action Assigned to: J314
Suspense date: 2 Dec 1976 Assigned by: JONES J301
NEW Suspense date: 12/11/76
Reconfirm suspense date: 11 Dec 1976
OK?: Y<CR>
>>SUSPENSE-DATE: (message) 41<CR>
(41) DTG: 010830Z Nov 1976 PSN: 24
Originator: WWPB PHNC 010830
Assignment: Action Assigned to: J3
Suspense date: [none] Assigned by: JONES J301
NEW Suspense date: 12/11/76
Reconfirm suspense date: 11 Dec 1976
OK?: Y<CR>
>>SUSPENSE-DATE: 148<CR>
(148) DTG: 220951Z Nov 1976 PSN: 135
Originator: AMEMBASSY MANILA
Assignment: Action Assigned to: J316
Suspense date: 7 Dec 1977 Assigned by: JONES J301
NEW Suspense date: 1/15/77
Reconfirm suspense date: 1 Jan 77
OK?: Y<CR>
>>ACTION (message) 4<CR>
```

(4) DTG: 080015Z Oct 1976 PSN: 3
Originator: COMSEVENTHFLT
Assignment: Action Assigned to: J312
Suspense date: 19 Dec 76 Assigned by: JONES J301
NEW Action-Cog: J313<CR>
NEW Suspense date:<CR>
Reconfirm assignment to: J313
OK?: Y<CR>
>>DONE<CR>
>COMPOSE<CR>
TO: J312, J313<CR>
Cc:<CR>
Subject: Change of action on <DTG><LDMX-FROM><CR>
Text:
<Explanation of change.>
<CTRL-Z>

APPENDIX B - LOAD SCENARIO 2

Logon

>LOG JONES<CR>

Role = J31x

>CONNECT J31x<CR>

Examine a summary of pending messages (there are 9)

1. Initial survey of RECENT messages is generated automatically when user first Logs on.

Display Msg #1; Create a reply to #1; Save the reply

2. >PRINT 1<CR>
>REPLY<CR>

Copies to ALL TO: ADDRESSEES? Y<CR>

Copies to ALL CC: ADDRESSEES? Y<CR>

[Hermes prints headers of generated reply]

(Type Text of Reply, to ^Z)
[User types text]

Send? Yes<CR> [CONFIRM]<CR>

Display Msg #2

Make a hardcopy of it

Delete Msg #2 from your pending file

3. >PRINT 2<CR>
>LIST 2<CR>
>DELETE2<CR>

Display Msg #3

Examine the names of J3's organizational folders

Examine a summary of the contents of one of the folders

Add Msg #3 to this folder and one other

4. >PRINT 3<CR>
>FILE 3 <J3>MESSAGE<CR>
>GET <J3>MESSAGE<CR>
>SHOW NAMES SEQUENCES<CR>
FOLDER-A
FOLDER-B
FOLDER-C
>SURVEY FOLDER-A<CR>

>ADD % (to sequence named) FOLDER-A <ESC>(and to sequence
named) FOLDER-B<CR>

Display Msg #4
Search Info readboard for msgs with subj Y
Examine the headers of those found in the search
Create a new folder containing Msg#4 and 6 of those found above

```
5. >GET MESSAGE
    >PRINT 4<CR>
    >FILE 4 INFO-READBOARD
    >GET INFO-READBOARD
    >SURVEY Subject: Y<CR>
    >CREATE SEQUENCE NEWFOLDER<CR>
    >>ADD %,6:11<CR>
    >>DONE<CR>
    >
```

Display Msg #5
Annotate Msg #5
Forward it to J312 without the annotation
Create a message to J31
Send it

```
6. >GET MESSAGE
    >PRINT 5<CR>
    >ANNOTATE <CR>
    >>COMMENT<CR>
        <text of comment><CTRL-Z>
    >>REFILE LAST<CR>
```

Note: This places the annotated copy of message 5 back in
the user's file.

```
>>DONE<CR>
REDISTRIBUTE 5<CR>
>Redistribute-To:J312
>COMPOSE<CR>
To: J31
Cc:<CR>
Subject: <text of subject><CR>
Text:
<text of message><CTRL-Z>
Send? Yes<CR>
```


Examine Action Log for pending Actions assigned to J311; Mark 2 of these as complete

```
7. >Edit ACTION-LOG<CR>
>>JOURNAL DIV-BRANCH J311<CR>
(Print-out of the journal entries for all messages
assigned to J311.)
>>ACTION (message) 2<CR>
(2) DTG: 080515Z Oct 1976 PSN: 1
Originator: 314 AIR DIV OC OSAN AB KOREA
Assignment: Action Assigned to: J314
Suspense date: 2 Dec 1976 Assigned by: JONES J301
NEW Action-Cog: Complete<CR>
Reconfirm Action-Cog Complete
OK?: Y<CR>
>>SUSPENSE-DATE: (message) 41<CR>
(41) DTG: 010830Z Nov 1976 PSN: 24
Originator: WWPB PHNC 010830
Assignment: Action Assigned to: J3
Suspense date: 11 Dec 76 Assigned by: SMITH J34
NEW Action-Cog: Complete<CR>
Reconfirm Action-Cog Complete
OK?: Y<CR>
```

Examine headers of msgs 6-9

```
8. >SURVEY 6:9<CR>
<Surveys of Messages 6,7,8 and 9 are printed out.>
```

Delete Msg #6

```
9. >DELETE 6<CR>
```

Display msg #7;
Create a note to yourself;
File msg #7 in a personal folder

```
10. >PRINT 7<CR>
>ANNOTATE 7<CR>
>>COMMENT<CR>
<text of comment on Text:-field><CTRL-Z>

>>REFILE 7
>>DONE<CR>
>ADD 7 MYFOLDER<CR>
```

Display message #8
Search thru some folder for msgs with keyword Z
Display each found
Mark those found NOT to be archived
Examine log of your archived files

```
11. >PRINT 8<CR>
    >CONSIDER FOLDER-A/Keyword: Z<CR>
    >PRINT CSEQUENCE
    >MARK CSEQUENCE NO-ARCHIVE
    >SHOW ARCHIVED-FILES
```

Undelete Msg #2 and #6

```
12. >UNDELETE 2,6<CR>
```

Examine summary of pending messages again

```
13. >SURVEY RECENT<CR>
```

Logout

```
14. >LOGO<CR>
```

APPENDIX C - LOAD SCENARIO 3

Scenario 3 contains some hundred set of operations with considerable repetition from set to set. Shown below are selected samples, covering each of the principal types of operation illustrated in the full scenario.

Load Scenario 3 focusses on action assignment; it assumes an Action Officer is working systematically through a rather large file of inbound messages, dealing with the Action on each in turn. Under these circumstances, the Action officer would most likely take advantage of the HERMES Linefeed command, which allows him to step through the messages one by one. The linefeed command increases the current message-no., or CMESSAGE, by one, then PRINTS the message through the PTEMPLATE. The Action Officer would probably set his PTEMPLATE to a short summary showing only the message-fields he usually needs to see to be able to assign action of a message. Such a template might be:

SHORTFORM

- (1) Message-No. DATE:+ FROM:+
- (2) " " Suspense-Date:+ PSN:+
- (3) " " Subject:

Here, the DATE field corresponds to the LDMX Date-Time-Group but translated into a more readable format. The PSN is an LDMX-generated serial number.

EXAMPLE:

```
>COPY SHORTFORM PTEMPLATE<CR>
><LF>
22 DATE: 8 Oct 76 0138Z FROM: CDR JCRC NAS BARBERS HI
    Suspense-Date: 1 Nov 76 PSN: 000012
    JCRC MONTHLY STATISTCAL SUMMARY (MSS)
```

The ACTION and COG commands will default to the CMESSAGE, that is, if the CMESSAGE is 15, ACTION<CR> = ACTION 15<CR>

If the Action Officer desires to print out the message in full before assigning action, or to make a hard copy, he can specify the CMESSAGE by the shorthand symbol".

```
>PRINT . LONGFORM<CR>
>LIST .<CR>
```

EXAMPLE:

Some typical sets of HERMES commands used to implement ACTION assignment from the <MILMESEXP>ES3.Load-Scenario are:

1 Action (s)
Assign to J311

1. ><LF>
>SECRET<CR>
>ACTION<CR>
Assign Action To: J311<CR>
Suspense-Date: 17 Mar 77<CR>
Action-Cog Info:<CR>
Refile? Y<CR>
OK? Y<CR>

2 Action (C)
Display the text of message
Assign to J312

2. ><LF>
>CONFIDENTIAL<CR>
>PRINT . LONGFORM<CR>
>ACTION<CR>
Assign Action To: J312>CR>
Suspense-Date: 17 Mar 77<CR>
Action-Cog Info:<CR>
Refile? Y<CR>
OK? Y<CR>

4 Action (C)
Make a hardcopy of message
Assign to J314

4. ><LF>
>LIST .<CR>
>ACTION<CR>
Assign Action To: J314<CR>
Suspense-Date:<CR>
Action-Cog Info:<CR>
Refile? Y<CR>
OK? Y<CR>

8 Action (TS)
Mark for Director's Readboard
Assign to J333

8. ><LF>
>TOP-SECRET<CR>
>ACTION<CR>
Assign Action To: J333<CR>
Suspense-Date: 25 Mar 77<CR>
Action-Cog Info: J3<CR>
file? Y<CR>

OK? Y<CR>
>

To assign action completed:

>ACTION 17<CR>
Assign Action To: COMPLETE<>CR>
Suspense-Date: <CR>
Action-Cog Info:<CR>
Refile ? Y<CR>
OK?: Y<CR>

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BBN SECURITY DESIGN
FOR MME-HERMES

February 18, 1977

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BBN SECURITY DESIGN FOR MME-HERMES

I. INTRODUCTION

When you use MME-HERMES, it appears to be a single HERMES program, very similar to the current HERMES. The chief difference from the current HERMES is that the message-fields carry security-level labels.

You are able to use all the functions of the current HERMES to read and create messages and to create and modify such HERMES tools as sequences, filters, templates and switch settings. However, your access to the functions of the TENEX Executive program is limited to the normal pre-login commands.

Once you have logged in at a given security level, you are able to see all information at your security level or lower; but throughout your HERMES session, you are unaware of the existence of any part of the MME-HERMES system at a security level above your login security level. For example, a message in a MME-message file may contain an UNCLASSIFIED (U) Subject field and a TOP-SECRET (T) Text: field. If you are logged in at any level below TOP-SECRET, this appears to have a Subject field but no Text field and you have no way of knowing whether or not a Text field exists. If you are logged in as TOP-SECRET, you see both the Subject and the Text fields. Before you create messages, you are required to give special commands to set the security level of individual message-fields. All such fields must be at your login security level or lower.

II. CONCEPTS UNDERLYING THE BBN SECURITY DESIGN

1. The AIM Security Enhancements

MME-HERMES will run under the control of the AIM (1) security enhancements to the TENEX Monitor, to ensure that HERMES cannot accidentally cause a security breach.

2. The Trusted Job

When you log into MME-HERMES, you are logged in at the minimum of your maximum level and the terminal maximum level. Commands within Hermes allow you to change your login Security level. MME-HERMES includes a "Trusted Job" (TJ) which acts as the coordinator between the HERMES activities at different security levels.

The TJ, in turn, creates a separate and complete HERMES job at your security level and at each security level below your security level. Each "Security-Level HERMES" (SLH) job operates independently. All communication from higher to lower security levels is done through the TJ.

However, you are not aware of the TJ or the multiple SLH jobs. You appear to be communicating with a single HERMES which knows about security levels and which shows you all information at your security level or lower.

3. Message Structure and Message Files

MME-HERMES stores messages in TENEX files. Each MME-message file appears to the user to be a single file, containing fields at different security levels. Actually, each MME-message-file consists of four TENEX message-files, one at each of the four security levels. Each Security Level Message-File (SLMF) contains only those portions of a message which are classified at the SLMF's security level. Each SLMF contains a header field for each message. Therefore, in order to display the contents of a message, MME-HERMES must examine the contents of all SLMF images of the message-file which are at or below its security level. Associated with each message file is a parse file which contains parse information at or below its level.

- - - - -
(1)

S.R. Ames, Jr. and W.W. Plummer, "TENEX Security Enhancements", The MITRE Corporation, Bedford, Massachusetts, MITRE Technical Report, MTR 3217, vol. 1. 1 April 1976 (ARPA F19628-76C-0001, 807B, D73)

III. JOB STRUCTURE

1. Trusted Job

As mentioned above, an MME-HERMES actually consists of a "Trusted Job" (TJ) mediating information transfer between the user and up to four independent Hermes jobs operating at different security levels.

All information which is passed down security levels is passed by the TJ using the AIM SIGNAL feature. For any information other than commands without arguments, the TJ first displays the information to the user, requests confirmation and only then passes the information to the lower security level. The details of this communication process are:

- a) Commands without arguments which affect lower levels are re-displayed to the user and then passed as numbers. No confirmation is required.
- b) Commands with arguments which affect lower levels are passed as numbers and require user confirmation. These are: Add, Compose (if a template is given), Delete, Erase, Explode, File, Move, Get (if a message file is given), Release, Reply, Refile, Send and Undelete.
 - 1) File names are passed to lower levels as <DIRECTORY>FILENAME. The filename is up to 39 capital alphanumeric characters and hyphens. Directory is omitted if it's the connected directory.
 - 2) Object names are passed as strings of up to 50 alphanumeric characters and, "-", "!", and "&". Alphabetic characters are passed as capitals.
 - 3) Sequences are passed as a list of message numbers and message ranges. Ranges are specified by number:number.
 - 4) Numbers are passed as numbers.

2. The Hermes Jobs

There is a Hermes job at each level up to the user's maximum level. Each Hermes job supports all standard operations within the confines of its level of security, and there is no intercommunication between jobs. Thus, the concept is that at any time the user is talking to some particular Hermes job. That Hermes job carries out all the user's requests; it passes no commands or parameters to Hermes jobs at other levels. Any

information input to that Hermes job (e.g., message fields) is retained at its level of security.

A given Hermes job will be able to honor his requests only insofar as the security conditions allow it to do so. Attempts to carry out operations in violation of security will fail, but there will in general be no positive indication that a failure has occurred. As an example, if message 13 has a secret text field, and the user requests that confidential Hermes job "PRINT 13", no text will appear, but there will be no other indication of failure.

3. Message Files

This design is supported by a quadruplication of the present Hermes file structure. Hermes retains the concept of message files, but what appears to the user as a single "virtual" file is actually supported by four physical message files plus four index files, with one message file and one index file at each of the four levels.

Each message file contains information at its security level, each index file contains information at and below its level. The fields of a particular message are distributed across the files according to security level, and, as noted above, no assumption is made about the pattern of this distribution. A single message occupies the same "entry" in each of the files. In any given file this entry will vary in size depending on how much of the message resides at that security level. If a message has no fields at a given level, then its entry in the file at that level will be empty, but the entry will exist nonetheless. Thus, the existence and ordinal numbering of messages is kept uniform across the four files.

Because the design is insensitive to the security pattern of message fields, many different arrangements can be supported, including most of those suggested in the security scenarios. Among other things, it is perfectly possible to have multiple instances of certain message fields at different security levels.

The concept of a "current" or "active" message file is supported in the security design. At any moment in time, a given Hermes can be attached to a single "virtual" message file. It will "see" only as much of the total file as its security level permits. Thus, a Secret Hermes will have access to the Secret, Confidential, and Unclassified physical files that represent those security levels of the currently active virtual file.

4. Output Operations

Output commands are applied to all of the security levels accessible to a Hermes. "PRINT 13" would output those portions of message 13 accessible from the Hermes job to which the command was issued. Message fields above that level would not appear in the output.

Note that the presence of a message is known at all levels. At the least its ordinal number can be output by any Hermes (but only if the output template calls for that datum to appear). Using the standard survey template, for example, the output of all messages from even the lowest level would reveal at least an ordinal number for each message in the file.

5. The Draft Message

The draft message is maintained as a multi level virtual file with each constituent physical file containing message fields input through the Hermes job at its level. The draft message is accessible for display and output according to the logic suggested previously: a given Hermes can "see" all parts of the draft at its level and below. Input to the draft, and changes to existing fields of the draft are accomplished through the Hermes at the appropriate level.

6. Other Hermes Objects

In addition to messages, Hermes contains sequences, templates, filters, and switches. These will all be unclassified and exist in a single unclassified file.

IV. TERMINAL DESIGN

The terminal operates in two modes

- a) multilevel security
- b) single-level security

Initially the terminal assumes multi-level security, with the user's maximum security level set to UNCLASSIFIED.

Changing the maximum security level below the maximum security level displayed on the terminal clears the screen.

In the multi-level mode, every LF sent to the terminal causes the terminal to paint the following string at the left-hand margin of each line:

<security level> <space> <inverse video bar> <space>

Example:

U | >

In either mode, there is a display at the upper right-hand corner of the terminal screen which shows the maximum security level of the material displayed on the screen.

Changing from multi-level to single-level security clears the screen, except for the display of the maximum security level.

The terminal operates on 9-bit characters, consisting of the standard 7-bit ASCII code, plus one parity bit, plus one special "9th-bit" control bit. The "9th-bit" control bit can be set only if the job has secure write-down capability under AIM.

If the "9th-bit" control bit is set, the following characters have special meanings:

| | |
|---|---|
| D | Go to single-level screen. |
| E | Go to multi-level screen |
| F | Change the current security level to TOPSECRET |
| G | " " " " " " SECRET |
| H | " " " " " " CONFIDENTIAL |
| I | " " " " " " UNCLASSIFIED |
| J | Clear the current line and repaint the security-level bar at left-hand edge (multi-level only). |
| K | Set user's maximum allowed security level to TOPSECRET. |
| L | " " " " " " SECRET. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---------------|
| M | " | " | " | " | " | " | " | CONFIDENTIAL. |
| N | " | " | " | " | " | " | " | UNCLASSIFIED. |

(These are independent of the Hermes security level, but are not yet implemented.)

O Reinitialize. (Clear screen. Set maximum security level to UNCLASSIFIED. Set mode to multi-level.)

P Turn on inverse video display. (Used for output from TJ.)

Q Turn off inverse video display.

Some escape sequences that act as commands to the terminal are used in the WE Editor. These are defined as:

<ESC><string or character>

See the HP2645 User's Manual for further details.

V. TERMINAL LOCKING

The Hermes system provides a terminal locking feature, mediated by the TJ. When the user types CTRL-Y, the TJ requests a keyword and the user's password. Subsequently, no information is passed through the TJ and no input is accepted from the terminal until the keyword is typed again.

VI. RECLASSIFICATION

The reclassification feature of the TJ allows a user to reclassify the contents of any field. The TJ is passed a filename and security level. The contents of the file are shown (in chunks to fit the screen if necessary) and the user must confirm them. When done, the TJ puts out the same filename at the new level and deletes the original. (This feature is not implemented in the current simulation.)

VII. SUBJECT CLASSIFICATION

The subject classification will be extracted from the JANAP-128 format message received from the LDMX if it appears in well-defined locations. Otherwise, the overall message classification will be taken as the subject classification.

VIII. HARDCOPY, ARCHIVING AND SSO INTERFACES

The issues of hardcopy and archiving have not yet been addressed.

The SSO interface will be provided by allowing the SSO to login to the Exec. User security levels, passwords, release capability, and access to the system are provided using the Tenex monitor and exec. Login, logout and incorrect password information are also provided by Tenex.

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HERMES IN DATA MANAGEMENT

THE BLUE FILE

January 17, 1977

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HERMES in Data Management

The Blue File*

We have extended Hermes to handle message structure other than RFC-680 (the current ARPANET standard) and information records other than messages. One reason for doing this was to enable Hermes to process military format messages such as those to be employed in the Military Message Experiment. However, we were also motivated by a desire to further exploit the data management capabilities that were built into Hermes initially for message management. In particular, it appeared to us that the Hermes data manipulation functions could be put to good use in managing various types of files that might be created in an office environment.

This writeup provides some general notes on Hermes as a data management tool, and illustrates this new use of the system through the "Blue File", a data base of information on Navy and civilian ships -- Their characteristics, current location, employment, etc.* Other data management applications planned or in development at BBN include technical data on current and past projects, an information file on contracts and proposals, and various library files.

The key change to Hermes that opens it up for data management applications is a mechanism that allows the Hermes user to establish and name new types of information fields, and then to compose and process messages or records containing these fields. The full details of this new feature are covered in section XI of the revised User Guide, but a few key points may be in order here.

- o All Hermes functions can be applied to newly defined information fields, just as though they had been built into the system from the beginning.

- o Few users will need to concern themselves with the definition process. One individual can set up a new Hermes application for many other users.

- o Records containing newly defined fields can be transmitted as messages (to other Hermes systems) or managed

- - - - -
*The Blue File was made available to us through the courtesy of Commander Rose of the Naval Electronics Laboratory, San Diego. The version illustrated here is unclassified; there is also a classified version of the Blue File at NELC.

as conventional data files. As far as Hermes is concerned, messages and general records are one and the same.

o Hermes is quite flexible about record and file content: not all fields need be present in each record, and a file can contain records of mixed type - for example a mixture of messages and general office records.

THE BLUE FILE

The Blue File contains information on some 240 ships, about 58 representing units of the U.S. Navy, the remainder civilian ships and navy ships of foreign nationalities. Considerable information is recorded about each ship - its interantional radio call, name, type, key hull dimensions and tonnage, speed and range capabilities. In addition to this basic data, each ship record contains various field groups*, most of which deal with current conditions - the ship's mission, convoy membership (if any) casualty status, etc.

In addition to the basic ship data, the Blue File contains special records that provide mission data about each convoy, and generic information concerning classes of ships and weapons. Appendix A contains a dictionary naming and defining each field that appears in any of the record types, while Appendix B gives an example of each record type, as represented in Hermes.

As far as the hermes functions are concerned, each of the 300 plus records in the Blue File is equivalent to a message in an ordinary message file. Thus, as is brought out below, one can Print, Survey, List, or Compose records; pass them through templates; link them into sequences, etc.

DATA MANAGEMENT

The data management functions of Hermes provide various ways to access and manipulate the information contained in the Blue File. Just as with messages, we can retriive records by ordinal number in the file:

```
>survey 4,13,99,173
  4 NAT: US TYPE: CV  HUL: 66  NAM: AMERICA  SHIPCLAS: KITTYHAWK
```

- - - - -
*The Blue File, as we received it was represented as a relational data base, and each of these field groups was recorded as a relation.

```
13 NAT: US TYPE: SSN HUL: 646 NAM:GRAYLING SHIPCLAS: STURGEON
99 NAT: UR TYPE: DDG HUL: 564 NAM: OBRAZSTSOVY SHIPCLAS: KASHIN
173 NAT: NE TYPE: BULK HUL: 0 NAM: AMSTELSLUIS SHIPCLAS: AMSTERDAM
```

As with messages, records can be retrieved by number, but it's often more useful to retrieve a particular record by its content

```
>survey NAM SARATOGA
5 NAT: US TYPE: CV HUL: 60 NAM: SARATOGA SHIPCLAS: FORRESTAL
>
>survey UIC N00021
21 NAT: US TYPE: CG HUL: 29 NAM: JOUETT SHIPCLAS: BELKNAP
>
>survey IRCS RN29
87 NAT: UR TYPE: CA HUL: 840 NAM: SVERDLOV SHIPCLAS: SVERDLOV
>
```

We sought the ship named "Saratoga", the ship with Unit Identification Code 21, and the ship with International Radio Call "RN29".

TEMPLATES IN DATA MANAGEMENT

To generate the example above, we prepared a template called "SHORT" and then declared it to be the default template for the SURVEY command. SHORT outputs a few key fields of each record, the ship's nationality, type, hull number, name, and within its type, the class of vessel. For example, the "AMERICA" is a US carrier (TYPE:"CV") of the KITTYHAWK class. It has hull number 66.

```
>show SHORT
(1) Message-No.: " " NAT:+ " " TYPE:+ " " HUL:+ " " NAM:+ "
" SHIPC LAS:+
```

Our experience so far suggests that templates will be an important tool in data base applications such as the Blue File, where each record contains a large number of short fields. Template "LONG" extracts and formats the same information as SHORT plus that portion of each record that describes a ship's dimensions and capabilities:

```
>print 4,99,173 (using template) LONG
```

```
-----
4 NAT: US TYPE: CV  HUL: 66  NAM: AMERICA  SHIPCLAS: KITTYHAWK
  Hull Dimensions
    Length: 1072  BEAM: 130  Draft: 36
    Dead Wt: 0    Gross Wt: 0
  Capabilities
    Cruising Range  Norm: 12000  Max Spd: 4000
    Cruising Speed  Norm: 16.0   Max: 35.0

-----
99 NAT: UR TYPE: DDG  HUL: 564  NAM: OBRAZSTSOVY  SHIPCLAS: KASHIN
  Hull Dimensions
    Length: 471  BEAM: 53  Draft: 19
    Dead Wt: 0    Gross Wt: 0
  Capabilities
    Cruising Range  Norm: 5500  Max Spd: 1800
    Cruising Speed  Norm: 16.0   Max: 35.0

-----
173 NAT: NE TYPE: BULK  HUL: 0  NAM: AMSTELSLUIS  SHIPCLAS: AMSTERDAM
  Hull dimensions
    Length: 559  BEAM: 73  Draft: 32
    Dead Wt: 18900  Gross Wt: 13900
  Capabilities
    Cruising Range  Norm: 19000  Max Spd: 19000
    Cruising Speed  Norm: 14.0   Max: 14.0
-----
```

Template LONG appears in Appendix C together with the other templates and sequences that figure in this discussion.

Templates can also be put to use as a tool for extracting grouped fields from a record. In fact, judicious use of templates allows one to form any desired information grouping whether or not it was anticipated in constructing the data base. An important field group in the Blue File is called "MOVES". It gives some notion of a ship's mission - its departure and destination points, estimated times of departure and arrival, etc.

To extract this information from each record (plus other key data such as a ship's type and nationality) we constructed a template called "MOVES". To illustrate MOVES, let's check up on shipping scheduled into Lisbon on a given day:

```
>print DST LISBON/ETA-(DATE) ON 14-JAN-76 (using template) MOVES
```

212 NAT: NO TYPE: BULK HUL: 0 NAM: TENNERAIRE SHIPCLAS: WILHELMSON
Mission Data

Departure Ctry: UR Port: LENINGRAD Etd: 0
Destination Ctry: PO Port: LISBON Eta: 14-Jan-76 1600-GMT

213 NAT: NO TYPE: BULK HUL: @ TENERIFFA SHIPCLAS: WILHELMSON
Mission Data

Departure Ctry: UR Port: LENINGRAD Etd: 0
Destination Ctry: PO Port: LISBON Eta: 14-Jan-76 1600-GMT

214 NAT: NO TYPE: BULK HUL: 0 NAM: TENNESSEE SHIPCLAS: WILHELMSON
Mission Data

Departure Ctry: UR Port: LENINGRAD Etd: 0
Destination Ctry: PO Port: LISBON Eta: 14-Jan-76 1500-GMT

SEARCHING FOR RECORDS

This example also shows how the search capabilities of Hermes make it possible to retrieve indefinite numbers of records that may meet certain conditions. Many other search patterns are also possible. For example, let's take a quick look at Russian ballistic missile subs:

>survey TYPE SSBN/NAT UR

| | | |
|--------------------------------|-------|------------------|
| 63 NAT: UR TYPE: SSBN HUL: 901 | NAM:* | SHIPCLAS: DELTA |
| 64 NAT: UR TYPE: SSBN HUL: 902 | NAM:* | SHIPCLAS: |
| 65 NAT: UR TYPE: SSBN HUL: 501 | NAM:* | SHIPCLAS: YANKEE |
| 66 NAT: UR TYPE: SSBN HUL: 502 | NAM:* | SHIPCLAS: YANKEE |
| 67 NAT: UR TYPE: SSBN HUL: 518 | NAM:* | SHIPCLAS: YANKEE |

USE OF SEQUENCES

Although search techniques can be used at any time, it's often more convenient (and efficient) to build index structures that link together related records. Sequences provide a mechanism for doing this in Hermes.

Certain ships in the Blue File belong to one of three convoys. Since a convoy lasts for some time, and its members will often be accessed as a group, it will be convenient to represent each convoy as a sequence:


```
>create sequence CTW09
>>add RELATION SHIPS/NCNAMTIT CTW09
>>show
104:112,177:186
>>done
>
```

Sequence "NL53" was created with those ships belonging to the convoy of the same name. Let's look at its membership:

```
>print CTW09 (using template) CONVOY
104 TYPE: BULK NAT: US NAM: GREENVILLE#VICTORY      Cgo: VNAD
105 TYPE: BULK NAT: US NAM: JOHN#TOULE              Cgo: CHRORE
106 TYPE: BULK NAT: US NAM: FRANCIS#MCGRAW          Cgo: TIN
107 TYPE: BULK NAT: US NAM: ANDREW#MILLER           Cgo: TIN
108 TYPE: BULK NAT: US NAM: MORRIS#E.CRAIN          Cgo: VNAD
109 TYPE: BULK NAT: US NAM: TRUMAN#KIMLOW           Cgo: VNAD
110 TYPE: BULK NAT: US NAM: JAMES#E.ROBINSON         Cgo: PHOS
111 TYPE: BULK NAT: US NAM: JOSEPH#E.MERRILL        Cgo: CHRORE
112 TYPE: BULK NAT: US NAM: JACK#J.PENDLETON        Cgo: CHRORE
177 TYPE: BULK NAT: SF NAM: MERCHANT                Cgo: CHRORE
178 TYPE: BULK NAT: SF NAM: PIONEER                 Cgo: CHRORE
179 TYPE: BULK NAT: SF NAM: SEAFARER                Cgo: VNAD
180 TYPE: BULK NAT: SF NAM: SHIPPER                 Cgo: VNAD
181 TYPE: BULK NAT: SF NAM: STATESMAN               Cgo: TUNGST
182 TYPE: BULK NAT: SF NAM: TRADER                  Cgo: TUNGST
183 TYPE: BULK NAT: SF NAM: TRANSPORTER             Cgo: TUNGST
184 TYPE: BULK NAT: SF NAM: VANGUARD                Cgo: CHRORE
185 TYPE: BULK NAT: SF NAM: VENTURE                 Cgo: CHRORE
186 TYPE: BULK NAT: SF NAM: VICTORY                 Cgo: CHRORE
```

Template "CONVOY" was designed to provide basic data plus each ship's cargo - items that figured in the Convoy relation of the original Blue file.

SUMMARY AND REFERENCE RECORDS

Summary data for the convoys in the Blue File is provided by special records - one for each of the three convoys represented. We linked these records together into a "master sequence" of convoys, and created a template for displaying their content:

```
>print CONVOYS (using template) DCON
```

276 Name: AN72 Escort Code: TU24.2.1 Est. Spd.: 15.0
Departure Ctry: SA Port: ALMANAMA Etd: 22-DEC-76 1600-GMT
Destination Ctry: US Port: NEW#YORK Eta: 31-JAN-76 0800-GMT
Estimated Posit: 1716S00156W As Of: 18-JAN-76 1200-GMT

277 Name: NL53 Escort Code: TU24.2.2 Est. Spd.: 15.0
Departure Ctry: US Port: NEW#YORK Etd: 12-JAN-76 0800-GMT
Destination Ctry: UK Port: LIVERPOO Eta: 20-JAN-76 1600-GMT
Estimated Posit: 4735N01249W As Of: 1-JAN-76 8120-GMT

278 Name: CTW09 Escort Code: TU24.2.3 Est. Spd.: 15.0
Departure Ctry: SF Port: CAPETOWN Etd: 07-JAN-76 1200-GMT
Destination Ctry: US Port: WILMINGT Eta: 24-JAN-76 1400-GMT
Estimated Posit: 1921N03408W As Of: 18-JAN-76 1200-GMT

Having generated summary data, we could now probe the details of each convoy, such as its membership (as illustrated above), the Navy units escorting it, etc. For example, to get a look at the escort for CTW09 we can:

>survey OPCODE TU24.2.3

| | | | |
|---------------------|-----------|----------------|----------------|
| 48 NAT: US TYPE: FF | HUL: 1053 | NAM: ROARK | SHIPCLAS: KNOX |
| 49 NAT: US TYPE: FF | HUL: 1054 | NAM: GRAY | SHIPCLAS: KNOX |
| 50 NAT: US TYPE: FF | HUL: 1055 | NAM: HEPBURN | SHIPCLAS: KNOX |
| 51 NAT: US TYPE: FF | HUL: 1056 | NAM: CONNOLE | SHIPCLAS: KNOX |
| 52 NAT: US TYPE: FF | HUL: 1057 | NAM: RATHBURNE | SHIPCLAS: KNOX |
| 53 NAT: US TYPE: FF | HUL: 1058 | NAM: MEYERKORD | SHIPCLAS: KNOX |
| 54 NAT: US TYPE: FF | HUL: 1059 | NAM: W.S.SIMS | SHIPCLAS: KNOX |
| 55 NAT: US TYPE: FF | HUL: 1060 | NAM: LANG | SHIPCLAS: KNOX |

>

Auxiliary data on ship and weapons classes is useful in tracking down the details of a particular vessel. We created a sequence (SHIP-TYPES) of all generic ship class records, and a template (SHIPT) for printing this information. We can use these, together with similar information on weapons classes to examine the weapons complement of a particular vessel - say the nuclear sub (type SSN) with Hull Number 638:

```
>survey TYPE SSN/HUL 638
  11 NAT: US TYPE: SSN  HUL: 638  NAM: WHALE  SHIPCLAS: STURGEON
>
>print SHIP-TYPES /SHIPCLAS STURGEON (using template) SHIPT
```

```
-----
242 NAT: US  TYPE: SSN  SHIPCLAS: STURGEON
WEAPONS: SUBROC 4/6
      21"#US 4/12
Hull Dimensions
  Length: 292  BEAM: 32  Draft: 26
  Displacement: 4630
Capabilities
  Cruising Range   Norm: 0   Max Spd: 0
  Cruising Speed   Norm: *   Max: 30.0
  Endurance: 96
```

```
>PRInt WEPSNOM SUBROC,WEPSNOM 21"#US
Message 279;      72 chars
RELATION: WEAPONS
WEPSNOM: SUBROC
WEPSDES: ASW#MISSILE
MAXRANGE: 25
```

```
Message 295;      68 chars
RELATION: WEAPONS
WEPSNOM: 21"#US
WEPSDES: TORPEDO
MAXRANGE: 12
```

BUILDING A DATA BASE

The Blue file was machine-transformed from its original format into one compatible with Hermes, a technique that would be recommended where any significant amount of machine readable data pre-exists the Hermes application. Total time to write the conversion program and process the conversion was on the order of a couple of man-days.

The Hermes message editor can be put to use in creating new files or adding records to an existing one. We made up a template for creating new ships-records:

>compose SHIP
Prompted message composition:
RELATION: ships
Fcc: <MYER>GB.MSGS;1
Please enter ship data
VCN: x0001
NAM: Argo Merchant
TYPE: TNKR
NAT: LI
Basic Dimensions
LGH: 750
DFT: 36
BEAM: 85
Cruising Speed/Range
NCS: 14
NCM: 12000
Max Speed/Range
MCS: 16
MCM: 18000
Send?: Yes
Message <[BBN-TENEXF]13-Jan-77 15:07:32.MYER> sent.
1 new message has just arrived
307 NAT: LI TYPE: TNKR NAM: Argo Merchant
CMESSAGE(=.) = 295
>
>
>
>PRInt 307 (using template) LONG

307 NAT: LI TYPE: TNKR NAM: Argo Merchant
Hull Dimensions
Length: 750 BEAM: 85 Draft: 36
Dead Wt: Gross Wt:
Capabilities
Cruising Range Norm: 12000 Max Spd: 18000
Cruising Speed Norm: 14 Max: 16

Records can be edited through the Hermes EXPLODE function in conjunction with the REFILE operation (which will be released shortly).

FUTURE PLANS

This latest development represents one step in an evolutionary process; we plan to continue improving Hermes' data handling capabilities in the months ahead. Currently planned extensions include:

- o The ability to create and manipulate records with more general types of structure (e.g., list structure, repeating grouped fields, etc.). The more general the record structure, the more kinds of information relationships we can represent.
- o The ability to create more powerful kinds of index structures.
- o Enhanced search capabilities.
- o Improved archiving and storage management.
- o The ability to handle advanced data types such as facsimile and digitized, compressed speech.

| NAME | DEFINITION | UNITS |
|--------|---|---------------------|
| ANAME | ABBREVIATED NAME OF UNIT | N/A |
| BEAM | BEAM (WIDTH) OF A SHIP | FEET |
| CADAT | PROJECTED DATE OF CHANGE OF UNIT'S READINESS CONDITION | N/A |
| CARAT | PROJECTED OVERALL READINESS RATING THE UNIT EXPECTS TO ATTAIN | N/A |
| CASREP | DTG OF CASUALTY REPORT MESSAGE | N/A |
| CONAM | NAME OF COMMANDING OFFICER | N/A |
| DEP | NAME OF PORT, OR GEOCOORDINATES OF POSIT, FROM WHICH SHIP HAS DEPARTED OR WILL DEPART | N/A |
| DFT | DRAFT OF A SHIP | FEET |
| DISPL | DISPLACEMENT OF A NAVAL SHIP | TONS |
| DOCTR | INDICATES WHETHER A DOCTOR IS EMBARKED | N/A |
| DPC | COUNTRY CODE FOR SHIP'S DEPARTURE POINT ON THIS MOVE | N/A |
| DSC | COUNTRY CODE FOR SHIP'S ARRIVAL POINT ON THIS MOVE | N/A |
| DSP | DESTINATION PORT | N/A |
| DWT | UNLADEN (DEAD) WEIGHT OF SHIP | HUNDREDS OF TONS |
| EBEG | DATE WHEN A UNIT'S EMPLOYMENT BEGINS | N/A |
| EEND | DATE WHEN UNIT'S EMPLOYMENT ENDS | N/A |

| NAME | DEFINITION | UNITS |
|--------|--|---------------------|
| EIC | EQUIPMENT IDENTIFICATION CODE; ASSIGNED TO A SPECIFIC PIECE OF EQUIPMENT | N/A |
| EICNOM | NARRATIVE MEANING OF EIC | N/A |
| EMBRK | ABBREVIATED NAME OF THE SHIP IN WHICH UNIT IS PHYSICALLY LOCATED | N/A |
| ENDUR | CRUISING ENDURANCE; MAX TIME AT SEA, BASED ON SUPPLIES AND CREW FATIGUE | DAYS |
| ETA | ESTIMATED TIME OF ARRIVAL | N/A |
| ETD | ESTIMATED TIME OF DEPARTURE | N/A |
| ETERM | TERM DEPICTING UNIT'S EMPLOYMENT | N/A |
| FTP | FUEL CODE; 1ST CHAR.=ENGINE TYPE, 2ND CHAR.=FUEL TYPE | N/A |
| GWT | GROSS WEIGHT OF A SHIP | HUNDREDS OF TONS |
| HIT | INDICATES WHETHER SHIP HAS BEEN DESIGNATED A HIGH INTEREST TARGET | N/A |
| HGEO | GEOGRAPHIC CODE FOR HOME LOCATION OF A UNIT | N/A |
| HTP | NUMERIC DESIGNATOR FOR A SPECIFIC HULL SHAPE | N/A |
| HUL | HULL NO. OF A NAVAL SHIP, OR 3-DIGIT CODE FOR OTHERS | N/A |
| IRCS | INTERNATIONAL RADIO CALL SIGN | N/A |
| LGH | LENGTH OF A SHIP | FEET |

| NAME | DEFINITION | UNITS |
|----------|---|----------------|
| LINEAL | LINEAL NO. OF UNIT C.O. | N/A |
| MAXRANGE | MAXIMUM EFFECTIVE RANGE OF A WEAPON | NAUT. MI. |
| MCM | CRUISING RANGE AT MAXIMUM SPEED | NAUT. MI. |
| MCS | MAXIMUM CRUISING SPEED OF A SHIP | KNOTS |
| MED | INDICATES WHETHER A DOCTOR IS EMBARKED | N/A |
| NAM | NAME OF A SHIP | N/A |
| NAT | COUNTRY CODE OF THE NATIONALITY OF SHIP'S REGISTRATION (FLAG FLOWN FOR NAVAL SHIPS) | N/A |
| NCARCITY | NAME OF PORT OF ARRIVAL OF SHIP OR CONVOY | N/A |
| NCARRCC | CONVOY ARRIVAL COUNTRY CODE | N/A |
| NCCGTYPP | TYPE OF PRIMARY CARGO ABOARD MERCHANT SHIP | N/A |
| NCCOMM | INDICATES CONVOY COMMODORE (OR VICE-, OR REAR-) IS EMBARKED | N/A |
| NCCQTYP | AMOUNT OF PRIMARY CARGO ABOARD A MERCHANT SHIP IN TONS, T, OR BARRELS, B. MAIL IN TONS OR BAGS, 'B' | T, B OR 'B' |
| NCDEPCC | CONVOY DEPARTURE COUNTRY CODE | N/A |
| NCDPCITY | NAME OF PORT OF DEPARTURE OF SHIP OR CONVOY | N/A |
| NCDRPOS | DEAD RECKONED POSIT OF A SHIP OR CONVOY AT A FUTURE TIME | DEG & MIN |

| NAME | DEFINITION | UNITS |
|----------|---|-----------|
| NCDRTIME | DAY, TIME AND MONTH OF ARRIVAL AT DR POSIT OF SHIP OR CONVOY | N/A |
| NCESDES1 | CODE IDENTIFYING CONVOY ESCORT TASK GROUP | N/A |
| NCETA | ESTIMATED DAY, TIME AND MONTH OF ARRIVAL OF SHIP OR CONVOY AT FIRST DESTINATION | N/A |
| NCETD | ESTIMATED DAY, TIME AND MONTH OF DEPARTURE OF SHIP OR CONVOY FROM PRESENT POSIT | N/A |
| NCIRCS | IRCS OF A SHIP OR CONVOY | N/A |
| NCM | ECONOMICAL CRUISING RANGE | NAUT. MI. |
| NCNAMTIT | NAME OF A SHIP OR TITLE OF A CONVOY | N/A |
| NCS | NORMAL CRUISING SPEED OF A SHIP | KNOTS |
| NCSOA | SPEED OF ADVANCE OF A SHIP OR CONVOY | KNOTS |
| OPCON | ABBREVIATED NAME OF UNIT EXERCISING OPERATIONAL CONTROL OVER UNIT REPORTING | N/A |
| OWN | COUNTRY CODE OF NATIONALITY OF REAL OWNER OF SHIP | N/A |
| PCFUEL | REPORTED PERCENT FUEL ON BOARD | N/A |
| PTC | SHIP'S COURSE AT HISTORICAL POSIT | DEGREES |
| PTD | DATE AND TIME SHIP WAS REPORTED AT HISTORICAL POSIT | N/A |
| PTP | GEOGRAPHICAL COORDINATES OF SHIP'S HISTORICAL POSIT | DEG & MIN |

| NAME | DEFINITION | UNITS |
|----------|--|-------|
| PTS | SPEED OF SHIP AT HISTORICAL POSIT | KNOTS |
| RANK | ABBREVIATED RANK OF UNIT CO | N/A |
| READY | CURRENT OVERALL COMBAT READINESS OF A UNIT | N/A |
| REASN | CODE INDICATING MEASURED RESOURCE AREA RATING OR OTHER REASON WHY UNIT IS NOT C-1 | N/A |
| SHIPCLAS | SHIP CLASS | N/A |
| SOA | SPEED OF ADVANCE OF A SHIP | KNOTS |
| TFUEL | TYPE OF FUEL USED BY A SHIP (UNIT) | N/A |
| TRAKNR | TRACK NUMBER LOCALLY ASSIGNED TO AN AIR OR SURFACE TARGET IN THE TASK FORCE OPERATING AREA | N/A |
| TYPE | SHIP TYPE ACRONYM | N/A |
| UIC | UNIT IDENTIFICATION CODE; ASSIGNED TO USN SHIPS | N/A |
| VCN | VESSEL CONTROL NUMBER; A UNIQUE, NON-CHANGING, NUMBER ASSIGNED BY NOSIC TO NON-USN SHIPS | N/A |
| WEPSCAP | CAPABILITY OF WEAPONS INSTALLATION IN TERMS OF NO. OF LAUNCHERS, AND NO. OF POUNDS CARRIED | N/A |
| WEPSDES | NARRATIVE DESCRIPTION OF A WEAPON OR WEAPONS SYSTEM | N/A |
| WEPSNOM | NOMENCLATURE OF A WEAPON OR WEAPONS SYSTEM | N/A |

Blue File -- Appendix B: Sample Records

PAGE 1

Message 5; 541 chars UNSEEN
RELATION: SHIPS
UIC: N00005
VCN: 0
IRCS: NABG
NAM: SARATOGA
TYPE: CV
HUL: 60
HIT: *
NAT: US
OWN: *
HTP: 0
GWT: 0
DWT: 0
LGH: 1039
DFT: 37
BEAM: 130
FTP: 1J
MCM: 4000
MCS: 33.0
MED: D
NCM: 9000
NCS: 16.1
EBEG-(DATE): 15-Jan-76
EEND-(DATE): 20-Jan-76
ETERM: RAV
DEP: NORFOLK
DPC: US
ETD-(DATE): 21-Jan-76 0800-GMT
DST: 6000N03000W
DSC: *
ETA-(DATE): 26-Jan-76 0800-GMT
SHIPCLAS: FORRESTAL
ANAME: SARATOGA
EMBRK: *
CONAME: A.BROWN
RANK: CAPT
LINEAL: 4836
OPCON: CTG67.3
HOGEO: NORF
PCFUEL: 100
DOCTR: D

Blue File -- Appendix B

PAGE 2

Message 203; 347 chars
RELATION: SHIPS
UIC: *
VCN: 22009
IRCS: K4P8
HIT: *
NAM: TAMPA
TYPE: BULK
HUL: Ø
NAT: NO
OWN: NO
HTP: Ø
LGH: 536
DFT: 36
BEAM: 7Ø
GWT: 12200
DWT: 12200
FTP: 1C
MCM: 22000
MCS: 18.0
NCM: 25000
NCS: 15.0
MED: D
DEP: LONDON
DPC: UK
ETD-(DATE): Ø
DST: ROTTERDAM
DSC: NE
ETA-(DATE): 14-Jan-76 1200-GMT
SHIPCLAS: WILHELMSON

Message 246; 269 chars UNSEEN
RELATION: SHIP-TYPES
SHIPCLAS: BELKNAP
TYPE: CG
NAT: US
LGH: 547
DFT: 29
BEAM: 55
DISPL: 7900
ENDUR: 35
MCM: 2000
MCS: 34.0
NCM: 5500
NCS: 16.0
WEAPONS: TERRIER 1/10
 MK 32 6/150
 5"/54 1/2000
 3"/50 4/13000
 ASROC 1/12

Blue File -- Appendix B

PAGE 3

Message 278; 277 chars UNSEEN
RELATION: CONVOY
NCIRCS: 09C326
NCNAMTIT: CTW09
NCSOA: 15.0
NCARCITY: WILMINGT
NCARRCC: US
NCDPCITY: CAPETOWN
NCDEPCC: SF
NCETD-(DATE): 07-JAN-76 1200-GMT
NCETA-(DATE): 24-JAN-76 1400-GMT
NCDRTIME-(DATE): 18-JAN-76 1200-GMT
NCDRPOS: 1921N03408W
NCESDES1: TU24.2.3

Message 281; 87 chars
RELATION: WEAPONS
WEPSNOM: SEASPARROW
WEPSDES: SHORT#RANGE#AA#MISSILE
MAXRANGE: 10

Blue File -- Appendix C: Templates and Sequences

PAGE 1

>SHOW SHORT

(1) Message-No.: " " NAT:+ " " TYPE:+ " " HUL:+ " " NAM:+ " " SHIPC
**LAS:+

>SHOW LONG

(1)
(2) "-----"
(3) Message-No.: " " NAT:+ " " TYPE:+ " " HUL:+ " " NAM:+ " " SHIPC
**LAS:+
(4) " " "Hull Dimensions"
(5) " " " Length: " LGH: " " BEAM:+ " " Draft: " DFT:
(6) " " " Dead Wt: " DWT: " " Gross Wt: " GWT:
(7) " " "Capabilities"
(8) " " " Cruising Range Norm: " NCM: " " Max Spd: " MCM:
(9) " " " Cruising Speed Norm: " NCS: " " Max: " MCS:
(10)
(11)

>SHOW MOVES

(1)
(2) "-----"
(3) Message-No.: " " NAT:+ " " TYPE:+ " " HUL:+ " " NAM:+ " " SHIPC
**LAS:+
(4) " " "Mission Data"
(5) " " " Departure Ctry: " DPC: " " Port: " DEP: " " Etd: " ET
**D-(DATE):
(6) " " " Destination Ctry: " DSC: " " Port: " DST: " " Eta: " ET
**A-(DATE):
(7)
(8)

>SHOW CONVOY

(1) Message-No.: " " TYPE:+ " " NAT:+ " " NAM:+ " " Cgo: " NCCGTYPP:

Blue File -- Appendix C

PAGE 2

>SHOW DCON

```
(1)
(2) "-----"
(3) Message-No.: " Name: " NCNANTIT: " Escort Code: " NCESDES1: " Est.
** Spd.: " NCSOA:
(4) " Departure Ctry: " NCDEPCC: " Port: " NCDPCITY: " Etd: " N
**CETD-(DATE):
(5) " Destination Ctry: " NCARRCC: " Port: " NCARCITY: " Eta: " N
**CETA-(DATE):
(6) " Estimated Posit: " NCDRPOS: " As Of: " NCDPTIME-(DATE):
(7)
```

>SHOW SHIPT

```
(1)
(2) "-----"
(3) Message-No.: " " NAT:+ " " TYPE:+ " " SHIPCLAS:+
(4) WEAPONS:+
(5) " " "Hull Dimensions"
(6) " " Length: " LGH: " " BEAM:+ " Draft: " DFT:
(7) " " Displacement: " DISPL:
(8) " " "Capabilities"
(9) " " Cruising Range Norm: " NCM: " Max Spd: " MCM:
(10) " " Cruising Speed Norm: " NCS: " Max: " MCS:
(11) " " Endurance: " ENDUR:
(12)
(13)
```

>SHOW SHIP

```
(1) literal [RELATION: ships]
(2) literal [Pcc: <MYER>GB.MSGS:1]
(3) "Please enter ship data"
(4) VCN:+
(5) NAM:+
(6) TYPE:+
(7) NAT:+
(8) "Basic Dimensions"
(9) LGH:+
(10) DFT:+
(11) BEAM:+
(12) "Cruising Speed/Range"
(13) NCS:+
(14) NCM:+
(15) "Max Speed/Range"
(16) MCS:+
(17) MCM:+
```

BBN Report No. 3541
SR-3

Bolt Beranek and Newman Inc.

Blue File -- Appendix C

PAGE 3

>SHOW ALL SEQUENCES

Sequences:

Current:

CSEQUENCE

1:307

(.= 307)

User-created:

AN72

113:129,162:166

CONVOYS

276:278

CTW09

104:112,177:186

NL53

130:161,167:176,187:194

SHIP-TYPES

241:275

WEAPON-TYPES

279:305

Fixed:

ALLMESSAGES(=*)

1:307